Installation and Maintenance Guide

M6501L/R IP PBX

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CONNEXITY

EADS TELECOM

EADS Defence and Security Systems SA
Rue JP Timbaud - Montigny Le Bretonneux
78063 St Quentin Yvelines Cedex - France
Tél : (0)1 34 60 80 00 - Fax : (0)1 34 60 72 41
Email : Technical-Support@eads.com

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About this guide

The M6501L/R IP PBX installer documentation has two guides and a record of customer data programming to cover all aspects of installing and using the M6501L/R IP PBX:

- Installation and maintenance guide,
- Programming Guide
- Programming Record

The present guide entitled This Installation and Maintenance Guide is intended to help you install the M6501L/R IP PBX.

This guide is set out in three parts:

- Initial installation
- Expanding the installation
- Maintenance and troubleshooting

There are two appendices:

- Appendix A: description of M6501L/R IP PBX cards.
- Appendix B: software alarm codes

You will also find a glossary of the technical terms used in this guide.

Each part contains a number of topics and a series of step-by-step tasks.

Understanding the parts in the guide

Part 1 takes you through the steps from unpacking to the first initialisation of the default configuration. With a few adjustments, for example setting the correct time and date, your system will be up and running after you have completed the procedures in this part. As it may not be necessary to change all areas of the system from the default configuration, there are four other parts containing topics to program as required. Any further information you may need is provided as cross references.

Part 2 is about expanding an installation either by adding equipment or upgrading software.

Part 3 describes maintenance and troubleshooting. Troubleshooting is intended to help with resolving possible programming errors and responding to errors detected by the system.

Understanding the conventions used in the guide

This guide tells you how to install your system step-by-step and uses the following visual aids:

Warning symbol

WARNING messages must be read carefully to avoid personal injury or damage to the equipment.

IMPORTANT

IMPORTANT messages draw your attention to the fact that some tasks may affect the correct operation of the installation.

Note: *Note messages indicate additional information or a technical explanation that may be useful to the installer.*

See more information later in the book.

See more information earlier in the book.

Description of the M6501L/R IP PBX

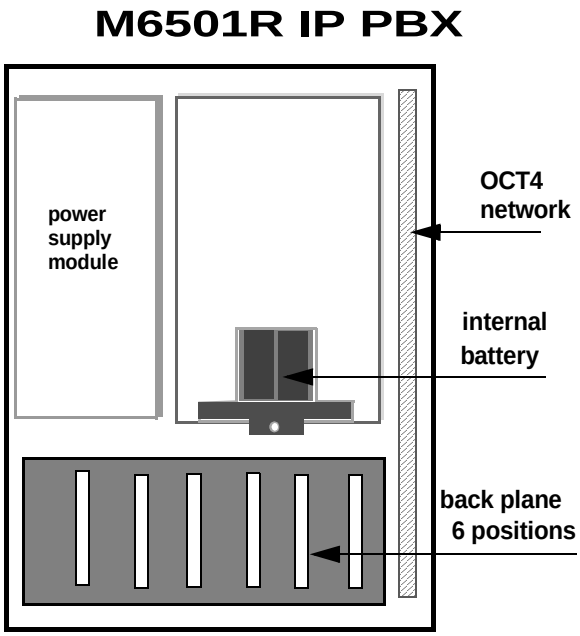
The M6501L/R IP PBX is an integrated business communications system supporting voice circuit switching, data packet switching, and the addition of applications servers. It is a B-class time-division multiservice ICS.

Depending on its equipment, this product may be a reduced M6501R IP PBX or an extended M6501L IP PBX.

Note: *The M6501R IP PBX and M6501L IP PBX are in the form of a small wall-mounted cabinet using the same standard OCT4 card.*

The M6501R IP PBX consists of a cabinet equipped with a main OCT4 card, ADS 150 power supply module and an integrated battery in the upper part of the cabinet.

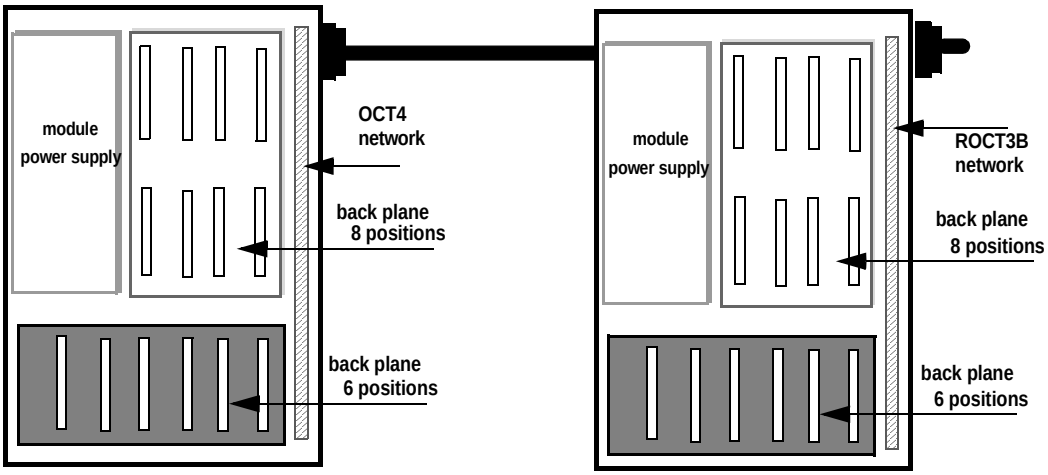
You can transform the M6501R IP PBX into an M6501L IP PBX by replacing the power-supply module and by adding a shelf instead of a battery.



To ensure continuity of service, the M6501R IP PBX must always be backed up by sealed maintenance free batteries for which the only operating state is floating mode, maintaining the load voltage of the components at 2.27 V.

The M6501L IP PBX consists of one or two cabinets. The basic cabinet with the standard OCT4 card is connected to the expansion cabinet, equipped with an ROCT3B card, via an external cable. Each cabinet has its own power-supply module (ADS 300).

M6501L IP PBX

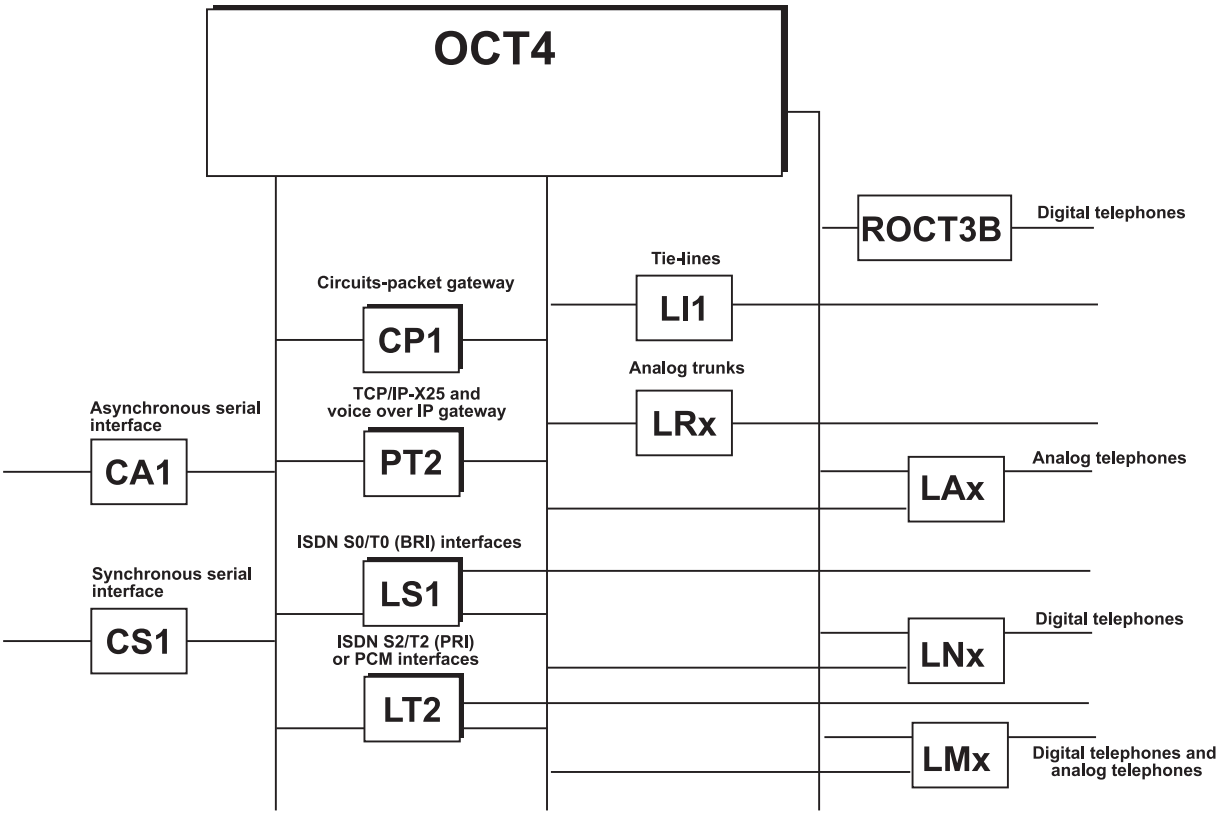


To ensure continuity of service, the M6501L IP PBX must be backed up by sealed maintenance-free batteries for which the only operating state is floating mode, maintaining the load voltage of the components at 2.27 V.

M6501L/R IP PBX system hardware architecture

The M6501L/R IP PBX is built around a central processing unit and peripheral connection cards. It has a multiprocessor architecture with shared memory resources. The central processing unit is based on a 133 MHz AMD Elan SC520 (ASPEN) microprocessor and performs all the functions required for connection management.

Both the system processor software and application software reside on the CPU card.



Cabinets and power supplies

Externally,M6501R IP PBX and M6501L IP PBX cabinets are identical.

The M6501R IP PBX

The M6501R IP PBX is housed in a wall-mounted cabinet containing 6 card slots (shelf 0) with the following characteristics:

- weight: approximately 18 kg (24.2 lbs)
- dimensions: 240 x 415 x 305 mm (L x H x D)
- power supply the characteristics of the ADS 150
  (ref. : HR5102AK : 3,4 A/+5 V ; HR5102AL: 4,1 A/+5 V ; HR5102AM and +: 5 A/+5 V) are:

Voltage	230 V (+/- 10%)
Frequency	50-60 Hz
Powerful	150 W
Integrated backup battery	48 V / 2.1 A
Converter	-48 V / 1.9 A +5 V / 5 A and -5 V / 0.4 A +12 V / 0.4 A and -12 V / 0.25 A 40 V / 0.1 a remote power supply isolated to 3 kV ring / 0.06 A

The M6501L IP PBX

The M6501L IP PBX is composed of one or two similar cabinets, depending on the customer configuration. The expansion cabinet can be positioned to the right or left of the main cabinet. Each cabinet contains 6 card slots (shelf 0 in the main cabinet and shelf 2 in the expansion cabinet). An optional shelf with 8 card slots enables the capacity of each cabinet to be expanded (shelf 1 in the main cabinet and shelf 3 in the expansion cabinet). The characteristics of the M6501L IP PBX are:

- weight: 18 kg for a fully equipped 1-cabinet configuration
  36 kg for a 2-cabinet configuration
- dimensions: 240 x 415 x 305 mm (L x H x D)
- power supply the characteristics of the ADS 300 power supply module are listed in the table below

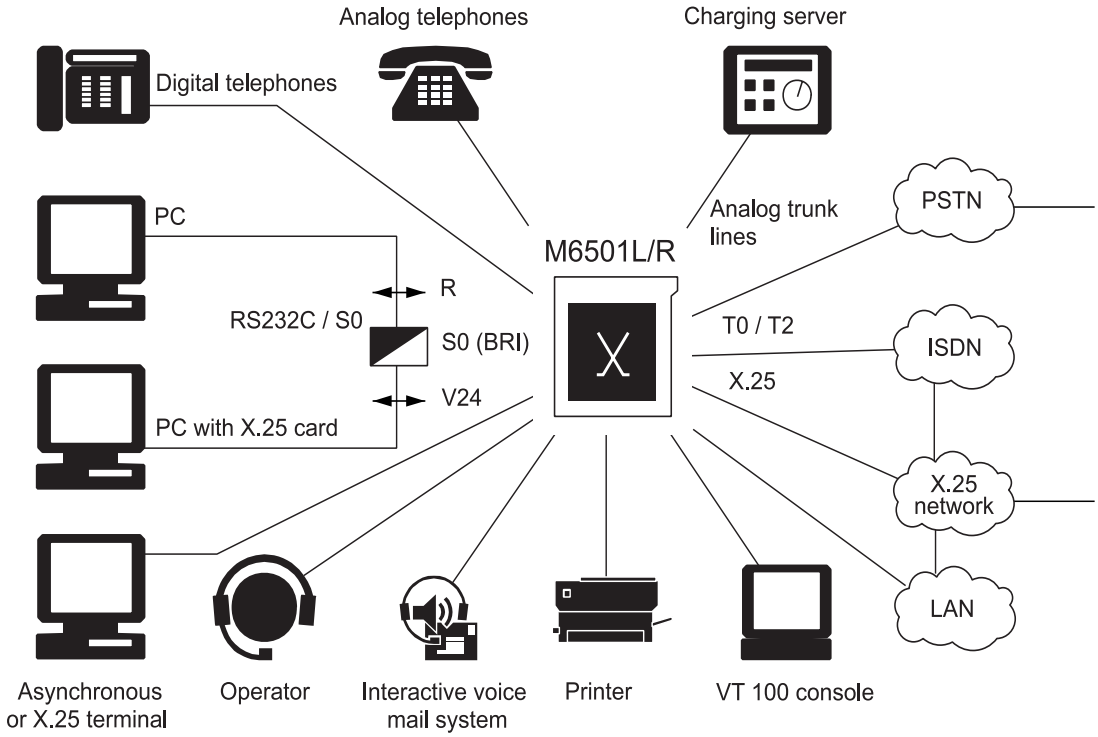
Voltage	230 V (+/- 10%)
Frequency	50-60 Hz
Powerful	200 W
External backup battery	48 V
Converter	-48 V / 4.5 A +5 V / 9 A and -5 V / 0.8 A +12 V / 0.5 A and -12 V / 0.3 A 40 V / 0.5 a remote power supply isolated to 3 kV ring 25-50 Hz / 0.15 A (balanced current)

Network connections

The M6501L/R IP PBX is a business integrated communications system offering both a telephone service and a synchronous and asynchronous data packet switching service.

It can be connected to the public network, a private network, an X.25 public network, and a LAN network. Depending on the local exchange used, trunks can be connected to the public switched telephone network (PSTN) along analogue network lines or using BRI and/or PRI accesses over an ISDN network.

Tie lines (TL) connect the PBX to private networks.



The table below lists the external links available.

Termination type	Card	Signalling
analogue network trunk	LR4	standard: subscriber signalling with pulse or DTMF dialling
ISDN: T0 BRI interface	LS1 LD4 LD4N	Numeris (ISDN) VN3 VN4-compatible ETSI
ISDN T2 interface	LT2	Numeris (ISDN) VN3 VN4-compatible ETSI
PCM digital line	LT2	. DID signalling (Socotel state-change MF for setting up network calls) . subscriber signalling (pulse or DTMF dialling for setting up network calls) . COLISEE pulse signalling for connection to the COLISEE network . COLISEE pulse signalling in master or slave mode for connection to another private installation . CLOISEE MF SOCOTEL pulse and state-change line signalling for connection to the COLISEE network . L0 pulse signalling for connection to another private installation
analogue 2- or 4-wire 50 Hz or E&M tie lines	LI1	. COLISEE pulse signalling for connection to the COLISEE network . COLISEE pulse signalling in master or slave mode for connection to another private installation . MF SOCOTEL pulse and state-change line signalling for connection to the COLISEE network . L0 pulse signalling for connection to another private installation . WINK START signalling for connection to another private installation . RITTER signalling for connection to another private installation
tie lines with voice frequency line signalling		. 2-wire L0 signalling for connection to another private installation . 4-wire L1 signalling for connection to another private installation
packet-switching network	CS1 or CS1+ CP1	. X25 signalling (2400, 4800, 19200 b/s, 48 and 64 kb/s)
private network	LT2	. QSIG ISDN signalling for connection to another private network
LAN	PT2	. MOVACS signalling for using voice over IP gateways

Connection capacities

IMPORTANT
The capacities below are given only as a guide.
It is essential to use the **configurator** tool, because of rules concerning PCM bus distribution on back planes and the checks to be performed on +5 V consumption.

All set and line combinations are allowed, provided you use no more than 6 cards for the M6501R IP PBX and no more than 14 cards per cabinet for the M6501L IP PBX. The maximum *capacities* shown in the table below do not apply for simultaneous operation.

Capacity	M6501R IP PBX	M6501L IP PBX	
		1 cabinet	2 cabinets
set junctors	44	108	228
analogue set junctors	40	104	208
digital set junctors	44	108	228
analogue network trunks	12	48	92
ISDN: T0 BRI interface	8	16	16
ISDN T2 interface	1	4	4

Configuration options of the M6501L/R IP PBX

The M6501L/R IP PBX is factory tested and supplied with default settings. Through programming, it is possible to define other specific configurations: standard configuration, multi-company configuration, multi-site configuration, hotel/motel and hospital functions.

It is necessary to determine which configuration is to be used before initialisation. At this point, the system will present the menus appropriate to the chosen configuration, for example, menus specifically for multi-company will not be visible when programming the standard configuration.

Default configuration

This is the configuration set using the default parameters. The system is fully functional and only requires a few adjustments after initialisation to be completely operational.

Standard configuration

The standard configuration is a customised configuration. It caters for the special requirements of a company. The standard configuration is suitable for single-company installations, whether in small premises or for larger-scale organisations with a large number of extensions. Customisation can include changing the numbering plan, setting up an automatic call distribution service, defining categories, and much more to optimise the use of the ICS for the customer.

Multi-company configuration

This is the term used to describe a configuration for many organisations using one ICS. The M6501L/R IP PBX can accommodate up to 16 different organisations. Each company/ department pair can be fully customised to suit its own unique requirements, including for example, its own central office trunks, operator consoles, speed dial numbers, and company greetings. Incoming calls are directed to the appropriate company and department. Interoffice calling, such as Station-to-Station, Call transfer, and Conference can be allowed or disallowed by the operator.

Hotel/motel configuration

The M6501L/R IP PBX offers additional features suitable for hotels. Monitoring can be carried out on an operator console or a digital set for the following services:

- rooms status - occupied or free
- check-in and check-out
- wake-up function
- billing credit allowance and record printouts
- message lamp control for message notification
- *Do Not Disturb* feature

Additional services can be defined to allow or disallow calls between rooms, connection to the front office, multi-site management, wireless services, etc.

The ICS has an external application interface (EAI) for using a hotel/motel management application.

Hospital configuration

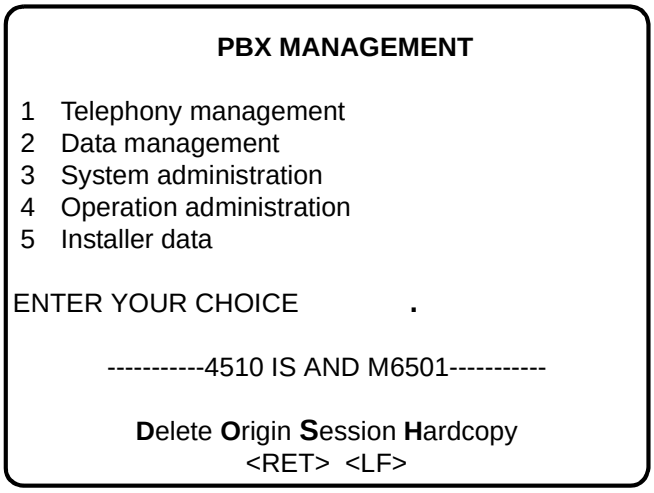
The hospital configuration is similar to the hotel/motel function. When programming a hospital configuration, refer to the characteristics for hotel/motel in the programming menus.

The ICS has an external application interface (EAI), for using a suitable management application.

The user interface

The M6501L/R IP PBX user interface is organised in a tree structure that consists of a main management menu with five different areas of programming, each containing submenus.

When the programming console is connected to the system and configured, the main menu below is displayed on screen.



These are the five main menus:

1. TELEPHONY MANAGEMENT	Access to menus for managing extensions, external trunks, numbering plans, operators, and call distribution
2. DATA MANAGEMENT	Access to menus for connecting to data equipment and creating links
3. SYSTEM MANAGEMENT	Access to menus for managing data and time, cards, operating terminals, passwords, and configurations available with the M6501L/R IP PBX.
4. OPERATION ADMINISTRATION	Access to menus for administration and monitoring extensions and trunks
5. INSTALLER DATA CONFIGURATION	Access to menus for setting up signalling, tone definition, and configuration transfer

Tree structure

The man machine commands (MMC) are set out in the form of tree structured menus.

You can progress through the tree structure by entering information at each level. There is also a special command to move back a level.

Menus

A menu consists of a menu name, lines, and a box indicating keystroke commands (delete, line feed, etc.).

A menu can be composed of one or more screens. In multi-screen menus, the titles and boxes are repeated on each successive screen.

Commands are displayed at the foot of each menu. These are provided to make your work easier.

Passwords

To access a menu family, enter one of the five passwords associated with the family concerned. This will define your data access rights. You may have normal access or protected access to the data entry fields (each field is displayed on one line). Types of access are defined in the software.

To access the DATA MANAGEMENT menu family, enter one of the five passwords associated with this family. Your access rights are now defined. Depending on the password entered, you will have one of the following sets of rights:

- complete read access / complete write access
- complete read access / write access in normal-access fields
- complete read access / no write access
- read access in normal-access fields / write access in normal-access fields
- read normal-access fields / no write access

To access the OPERATION ADMINISTRATION menu family, enter one of the three passwords associated with this family. Your access rights are now defined:

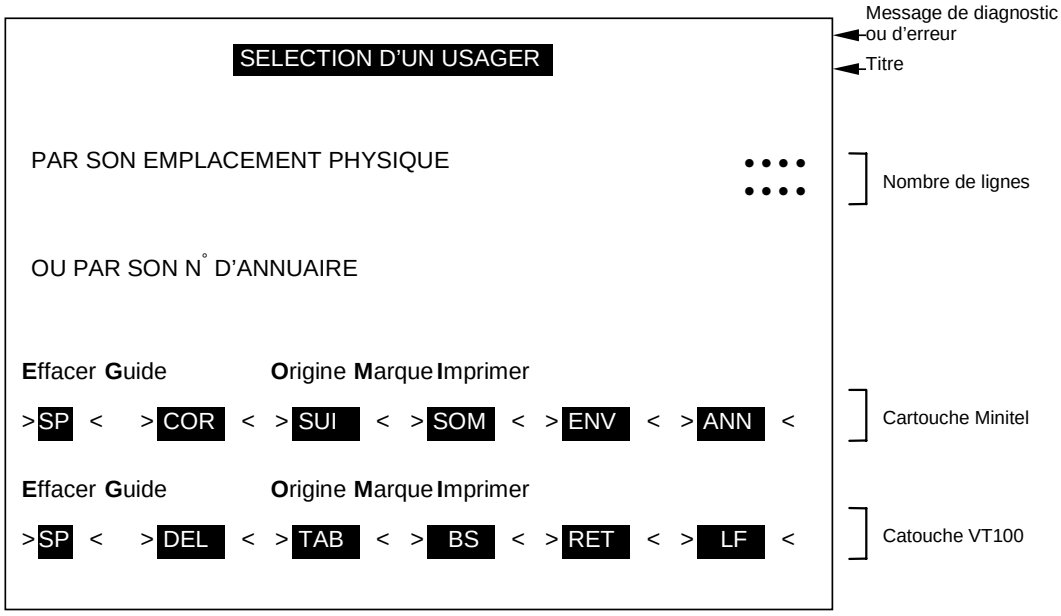
- compete read access / no reset allowed
- complete read access / reset of charging meters allowed
- complete read access / reset of charging meters and logbook allowed

The INSTALLER DATA family has only one password.

Menu definition and management

Each menu has up to four sections:

- a message bar for information and error messages
- the name of the menu
- lines of data options
- a box indicating keystroke commands



To ensure complete compatibility between Minitel (videotex) and VT100 terminals, the length of a display line is limited to 40 characters.

Note: *A menu consists of 1 to 8 screens. Each successive screen displays the name of the screen and the keystroke commands.*

Information or error messages

These messages are displayed in the centre of the first line on the screen, in reverse video and blinking. They appear when an error is detected. It is cleared by pressing any key.

Name of the screen

The name of the screen serves as a reference, indicating in which screen you are working. It consists of a single line and is displayed in the centre of the second line on the screen, in reverse video and double height. On a VT100 type terminal, it is displayed in double width. The name of the screen is either fixed or context-sensitive (context-sensitive for repetitive menus).

Lines of data options

A set of a maximum of 128 lines constitutes the menu text. These lines are displayed with no special effects. The block of text is displayed in the centre of the screen. It may be divided into 1 to 6 screens, each containing 16 lines. There are two major line families: simple lines and lines with a data entry field.

Keystroke commands

The keystroke command box indicates the keystroke commands that can be used in the screen. It displays 1 to 4 lines with special effects on the relevant letters of the words. Only the commands are displayed, no explanation is given. A word printed between the signs "<" and ">" refers to a key. A capital letter refers to the key to press to run a command.

Types of menu

There are seven types of menu:

- choice menus
- password menu
- selection menus
- intermediate data entry menus
- data entry menu
- repetitive menu
- display menu

These menu types can be divided into two families:

- intermediate menus (choice, password, selection, intermediate data entry)
- terminal menus (data entry, repetitive, display)

Confirming an intermediate menu always leads to another menu (intermediate or terminal). Terminal menus end the tree structure (last menu).

Choice menu

Choice menus are displayed on one screen. They contain a maximum of 15 different choices. The choices are numbered 1 to n. The last line is reserved for entering your choice. If you make an invalid choice, an error message is displayed. If you make a valid choice, the next menu in the tree structure is displayed.

Password menu

Password menus are displayed on one screen. The data entry line prompts the operator to enter a password. The characters of the password are not displayed. They are replaced by asterisks (*).

If you enter an incorrect password, an error message is displayed. After three consecutive errors, the password attempt is treated as a fraudulent attempt to access the system. This blocks the system for a few minutes and a report is entered in the log. If you confirm a correct password, the next screen in the tree structure is displayed.

Selection menu

Selection menus are displayed on one screen. They are used to enter 1 to 4 selection criteria to identify an element concerned by subsequent processing. If you enter a valid value, a repetitive menu opens.

Intermediate data entry menu

Intermediate data entry menus may or may not be repetitive. They are similar to terminal data entry menus. They are used to enter any configuration data not entered in the selection menu, if applicable. Repetitive commands are available in repetitive menus. The terminal menu is opened by pressing the Return key.

Data entry menu

Data entry menus contain a maximum of 128 lines. They are displayed on a maximum of six screens. They are used to enter all the data for an MMC. Entries are confirmed line by line.

You can only go to the next line if the field value on the current line is accepted. Otherwise, an error message is displayed and the data must be entered again. However, you can quit an incorrect field by confirming twice. In this case, the field is not modified. To quit this type of menu, return to the previous menu. A data entry menu is a terminal menu.

Repetitive menu

This type of menu is similar to the previous type. All the details given for the data entry menu apply.
You access this type of menu from a selection menu.
In repetitive menus, you can call up the next element or the previous element without returning to the selection menu. Navigating through the selection screen is transparent for the user via the "next" and "previous" commands. If you wish to make the same modification to all the selected items, use the "repeat" command. If an error is detected during the repeat operation, a message is displayed but the operation does not stop. Similarly, the "find" command can be used to define a search criterion for the next or previous item. The criterion has the format: "Field i = Vi and Field j = Vj and... etc."

The "listing" command is used to print out all the menus corresponding to the following items that meet the criteria set with the "find" command. The "type" command is used to reduce the printout for each item to a subset of lines in the menu. The "find" and "type" commands can be combined to carry out a partial conditional printout.

Display menus

Display menus may contain more than five screens. Only fixed and display lines are allowed. A menu of this type often contains the same block of lines repeated several times. The cursor cannot be moved. only the next and previous screens are authorised. The purpose of this type of menu is to display information and not to modify it. If preceded by a selection, this menu is of the repetitive type, and the "N", "P", and "L" commands are available.

Types of line

- fixed lines
- display lines
- ASCII lines
- digital lines
- list lines

Simple lines: fixed and display lines. These lines contain a text box on the left edge of the screen. The cursor cannot be positioned on a line of this type.

Data entry lines: ASCII, numeric, and list, with two zones: a text box on the left edge of the screen, and a data entry field on the right edge. The cursor can be positioned on this type of line if the user's access rights identified by the password are appropriate.

Generally, the cursor is only positioned on lines on which the user has the right to make modifications. If none of the lines in a screen is accessible, there is no cursor. In this case, some of the keyboard commands are not available.

Note: *A line may be repeated several times.*

Fixed lines

These lines display fixed text on the screen.

Display lines

These lines have a maximum of 40 characters. The cursor cannot be positioned on display lines.

The result displayed has a fixed part and a variable part specific to the MMC. The variable part consists of one or more ASCII strings and / or one or more list elements.

The ASCII line

This type of line has a text box and a data entry field containing a maximum of 40 ASCII characters. The cursor can be moved along the line to edit the ASCII string. Definition of "ASCII characters": the 26 letters of the alphabet (not case sensitive), the ten digits, conventional punctuation marks, space, and underscore (_).

To access the command mode in this type of field, press the Esc key before the command, if the command is a letter.

Numeric lines

The purpose of this type of line is to enter a numeric value expressed as a decimal. This value may or may not be limited.

Only digits are allowed. Pressing any other key is treated as a command (the Esc key is not necessary).

List lines

List lines are used to select a value. You do not enter the value directly, but identify it with a keyword selected from a predefined list specific to the MMC.

This gives better control over entering values (no errors are possible). The system also manages a list of prohibited values which can be different for each field referring to the same list.

When you position the cursor on this type of line, the list element displayed changes to reverse video. The following commands are used to scroll through the list elements: Space bar, Backspace, and Delete key.

In some lists, the required keyword can be obtained by entering the first few letters of the keyword. It is then displayed in full. An error message signals an empty search result. This selection mode is only available on the empty element ("....."). The commands must then be preceded by the Esc key.

Types of menu and types of line

The following table gives the various types of line possible for each type of menu:

Menu/line	Fixed	Display	ASCII	Digital	List
Choice	Yes	No	No	Yes	No
Password	Yes	No	Yes	No	No
Selection	No	No	Yes	Yes	Yes
Data entry	Yes	Yes*	Yes	Yes	Yes
Repetitive	Yes	Yes*	Yes	Yes	Yes
Display	Yes	Yes*	Yes*	Yes*	Yes*

* *Under certain conditions*

Commands

The operator uses the commands described below for navigation through the various screens using the cursor.

Some of the commands are available in all the menus, some are specific to a type of menu (repetitive menu), and some are temporarily masked according to the type of screen in use (a screen with no data entry fields).

When the cursor is in an ASCII data entry field, press the Esc key to activate the command mode before entering commands in ASCII form. The Esc key can be used before any command.

The commands described below are for a VT100 terminal. The table in the following section gives the correspondence between the VT100 commands and the Minitel (videotex) commands.

RETURN key: confirm entry

In intermediate menus, this key confirms the current screen and opens the next menu. If an error is detected, an error message is displayed. If no error is detected, the following screen is displayed.

In terminal menus, this key confirms the field in which the cursor is positioned and moves the cursor to the next field if no error is detected.

CURSOR UP and DOWN keys: navigation

These two keys are used to move the cursor to the next field or the previous field in a menu.

In selection menus, these keys do not provide a field confirmation function.

In terminal menus, these keys are used to confirm the current field before moving the cursor. The cursor is moved if no error is detected.

In multi-screen menus, the screen changes if the cursor is at one end of the screen (the end depends on the direction the cursor is moved).

FORWARD TAB and BACKSPACE keys: navigation

These two keys have the same meaning as the two previous keys:

FORWARD TAB has the same effect as **CURSOR DOWN**.

BACKSPACE has the same effect as **CURSOR UP**.

LINE FEED key: previous menu

This key returns the user to the previous menu in the tree structure.

In data entry or repetitive menus, LINE FEED confirms the current field in which the cursor is positioned. Return to the previous menu occurs if the field is correct.

CORRECTION key: correct

In ASCII or numeric fields, this key is used to delete the last character entered. In list fields, this key is used to go to the previous element in the list. If the cursor is at the start of the list, it moves the cursor to the end of the list.

Note: *This key is never used to confirm a field.*

SPACE bar: next list

In ASCII data entry fields, this key is used to enter a "blank space". You cannot enter a blank space in a numeric field.

In list fields, this key moves the cursor to the next element in the list. If the cursor is at the end of the list, this key moves the cursor to the start of the list.

Esc key: command mode

Command B (1 to 4) displayed at the bottom of the screen.

This key is used to switch to command mode, which means that the next character will be interpreted as a command and not as an ASCII character.

This key is available in all fields, but is only used for the empty element in list data entry fields and ASCII data entry fields.

"D" command: delete

In numeric data entry or ASCII data entry fields, this key is used to delete the entire field. The display then shows "."

In a field of list type, this command moves the cursor to the first element in the list.

This key cannot generate an error message as it does not confirm data entry.

"C" command: clear

This command is used to clear all occurrences of a given line that are repeated in the same menu, starting from where the cursor is positioned.

"Z" command: Zoom

This command can be used if the information and error message field displays `ZOOM AVAILABLE`. It is an implicit "mark" and "branch" command. The branching point is defined by the manufacturer. Generally, it opens up the menu for defining the object indicated by the cursor.

For example, you can zoom on the definition of a category in the (Extension characteristics) menu when defining the extension day category. You can also zoom on the composition of an intercom group, etc. The syntax is the same as for a mark command. You must give a marker number from 1 to 4.

The 'Branch' command is used as indicated above to return to the caller menu.

It is possible to zoom several times. Example: in the company or department field in the "Extension characteristics" menu, you can zoom the parameters of the company-department pair to view the call distribution service used for internal calls. You can then carry out another zoom on the call distribution service definition. To return, you can either carry out a cascade, or return directly according to the marker number specified in the return jump command.

"U" command: update

This command is used for an implicit "branch" following an information error message. Example: if you wish to delete an extension number, this number must not be in a hunt group, or an information error message will appear indicating that the extension is in a hunt group. When this information error message is displayed, the "correct" command is used to "branch" to the corresponding `HUNT GROUP SELECTION` menu. You can then remove the extension from the hunt group before returning to the original menu and restarting the task which produced the information error message.

The syntax is identical to the "zoom" command, including how to return to the original menu.

"B" command: begin

This key moves the cursor to the first field in the first screen of the menu. It is only available in terminal menus.

The cursor is only moved if the value confirmed in the field in which the cursor is positioned is correct.

Note: *If the cursor is already in the first field, an error message is displayed.*

"M" command: more

This key is used to move the cursor to the next screen in the menu. It is only available in terminal menus.

The cursor is only moved if the value confirmed in the field in which the cursor is positioned is correct.

If the cursor is already in the last screen, it cannot be moved and an error message is displayed.

"E" command: end

This key moves the cursor to the last field in the menu. It is only available in terminal menus (except display menus).

The cursor is only moved if the value confirmed in the field in which the cursor is positioned is correct.

If the cursor is already in the last screen, an error message is displayed.

A change of screen cannot occur if the cursor is in the last screen of the menu.

"O" command: origin (home)

This command is available in all menus, and returns the cursor directly to the first menu.

It requires confirmation. The second session is not re-initialised.

"S" command: mark session; "J": jump

These commands are displayed at the bottom of the screen.

- The "S" command is available in all menus and is used to mark a particular point or session in a menu. Up to four locations can be marked in this way, numbered 0 to 3.
- The "J" command returns the cursor to the location previously marked by the "S" command. You must indicate the marker number required (0 to 3).

By default, all the markers are initialised on the main menu at the top of the tree structure. In certain cases, the previous session is only partially restored, in which case a message specifies the problem.

Note: *The keystroke command box displays the various markers already recorded. Each marker is displayed on one line.*

"T" command: type (display)

This command is used to specify the lines to print in a menu. Up to 16 lines can be selected.

When this command is activated, the number of lines already selected is displayed. Three options are available:

- E : to erase the selection
- A : to add a line to the selected lines
- D : to reset the selection (= E + A)

If a line is selected several times, it is only printed once.

The lines are printed in the order in which they appear in the menu. The order in which they are selected is not significant.

"H" command: hardcopy

This key is available in all menus. It is used to print the current menu (the keystroke command box is not printed).

For multi-screen menus, all screens will be printed. The names of the screens are not repeated.

If the printer is unavailable, an error message is displayed.

Note: *This command requires confirmation. You do not have control of the terminal during printing.*

"F" command: find

This command is only available in repetitive menus.

It is used to set a search criterion for a following or previous element. The criterion is a logical AND equality test on a maximum of three values for fields anywhere in the menu displayed.

When the command is activated, three options are available:

- "E" to erase the criterion
- "A" to add a new criterion
- "'D" to reset the criterion (= E + A).The value required for the field must be entered before activating the command. Running the command does not confirm the value of the current field.

"N" command: next element

This command moves the user from one element to another in repetitive menus without returning to the selection screen.

If you have set a search criterion with the "F" (find) command, you are prompted to confirm. You can either confirm or cancel the criterion.

If there is no following element, or if you run the command in a menu type other than repetitive, an error message is displayed.

If the next selection is correct, the new menu is displayed. Where possible, the cursor is positioned in the field where the "next" command was run.

"P" command: previous element

This command moves the cursor to the previous element in repetitive menus. All the details given above for the "N" command apply to the "P" command.

"R" command: repeat

This command repeats the value of the field in which the cursor is positioned, in all the following elements that meet the search criteria (if any).

This command is only available in repetitive menus. If you run this command in any other type of menu, an error message is displayed.

You are prompted to confirm before the command is run.

If an error is detected during the repeat operation, a message is displayed, but the operation continues. The repeat operation stops when the selection task indicates that there are no more elements.

"L" command: listing

This command is only available in repetitive menus. It is used to print out the lines selected in all the menus containing elements that meet the search criteria, starting with the element from which the command was run.

You are prompted to confirm before the command is run.

Note: *This command stops if a print error occurs. In this case, an error message is displayed. You do not have control of the terminal during printing.*

"G" command: guide

This command can only be used on list fields. It is used to display, on the four lines of the keystroke command box, the first n elements in the current list.

If there is not enough room on the four lines of the keystroke command box (that is, there are more than 16 elements in the list), run the "guide" command again to display the 16 following elements.

If the keystroke command box becomes saturated, only the first 8 characters of each of the elements are displayed.

On a VT100 terminal, the keystroke command box is automatically updated to show the entries already made.

Note: *The longest lists are variable lists with elements supplied by the operator (for example, trunk group name). To use the command effectively, it is advisable to select names with different first letters (for example, do not use TKGP00, TKGP01 as you will have to enter T K G P 0 1, etc. every time).*

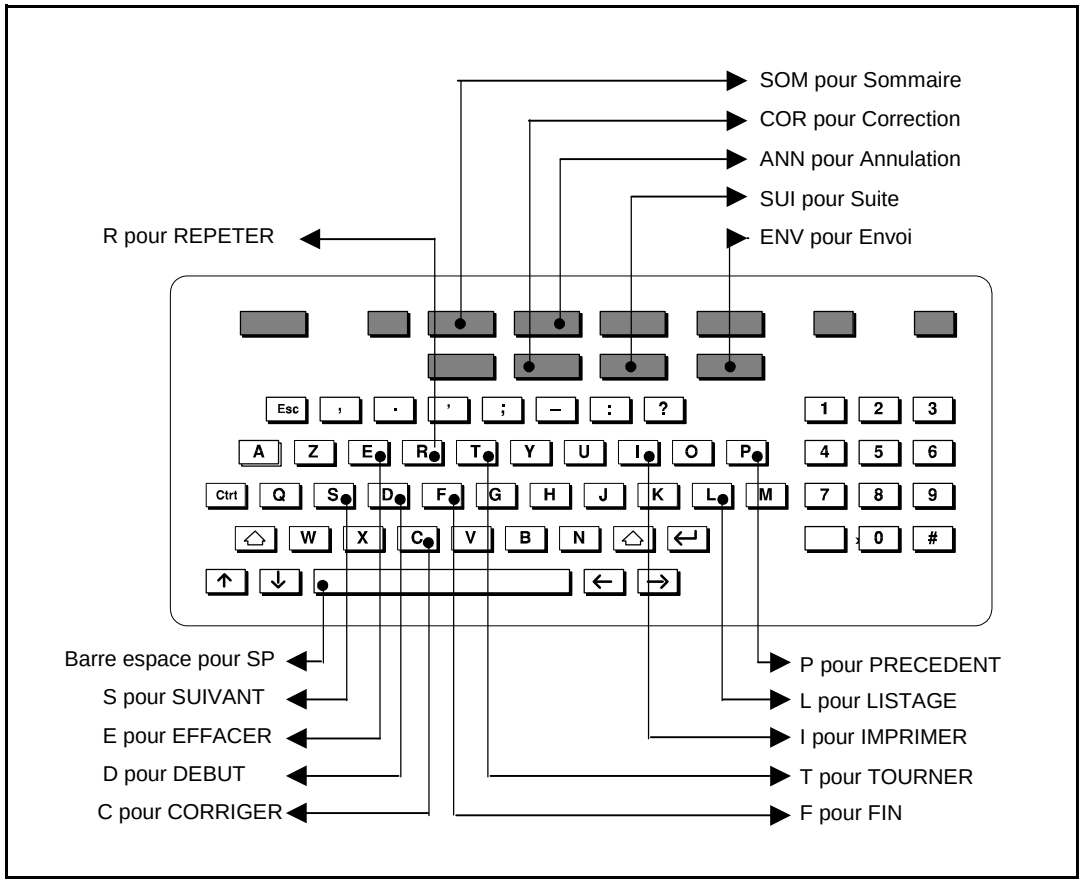
Correspondence between VT100 and Minitel (videotex) commands

The table below shows the correspondence between the VT100 and Minitel keys.

The commands are the same for both types of terminal..

VT100 key	Minitel key	Meaning
RETURN	ENVOI	VALIDATION
FORWARD TAB	NEXT	SCROLL UP
BACKSPACE	RETOUR	SCROLL DOWN
LINE FEED	CONTENTS	PREVIOUS MENU
CORRECTION	CORRECTION	CORRECT
SPACE	SPACE	NEXT LIST
ESCAPE	GUIDE	COMMAND MODE
CURSOR UP	NEANT	SCROLL UP
CURSOR DOWN	NEANT	SCROLL DOWN

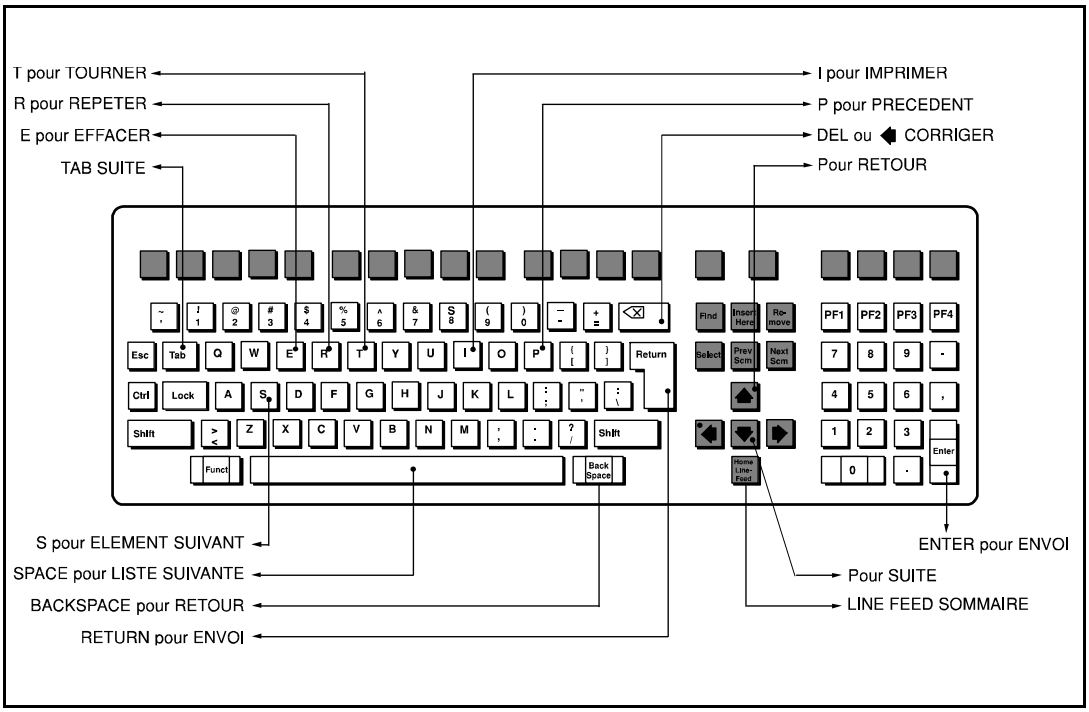
Keystroke commands for the Minitel screen



Layout of the keystroke command box on the Minitel screen

Suivant **P**récédent **R**épéter **L**istage
Begin More End Clear Print
<SP> <COR> <SUI> <SOM> <ENV> <ANN>

Falco terminal keyboard - VT100 mode



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Chapter 1 - Before you start

Only experienced technicians should service the system

The installer must be aware of the possible electrical hazards to which they may be exposed.
It is essential to take every precaution necessary for people's safety.

For the best results with the new M6501L/R IP PBX installation, use this section to help your preparation, before you start installing.

It contains a summary of the ideal site conditions, the inventory of the equipment to install, and a summary of the tools required to install and set up the M6501L/R IP PBX.

Surveying the customer site

Before you begin installing the ICS, check the site to make sure the conditions needed for the system to function properly are satisfied.

Here is a summary of considerations for the installation of the new MC 6501-C8L:

- ✔ location
- ✔ environment
- ✔ space
- ✔ electricity

Location

- Unpacking, installation, operation, service, and storage

  The location must be of sufficient size to house the ICS and a worktable. This table will be used to install a telephone set, a VT100 terminal or a computer, a printer, and all the other peripheral equipment.

- Main distribution frame and batteries

  Check that there is a suitable location for the MDF and batteries no more than four meters from the ICS cabinet. The MDF cable is 5 m long. Follow the supplier's instructions concerning location of the batteries.

- Minimum clearance

  You must allow clearance of at least 150 mm (49 ft) above the cabinets and 100 mm (33 ft) below to allow air to circulate. Also check that there is enough room above the ICS to reinsert the retaining screw on the top of the cabinet.

- Electrical devices

  There must be a minimum distance of 4 m (13 ft) from equipment such as photocopiers, electric motors, and other equipment that can produce electromagnetic or radio-frequency interference.

- Fire precautions

  A fire extinguishing system (for example, CO2 foam) needs to be in the room.

Environment

- General conditions

  The room should be clean, dry, and well-ventilated to allow free airflow.

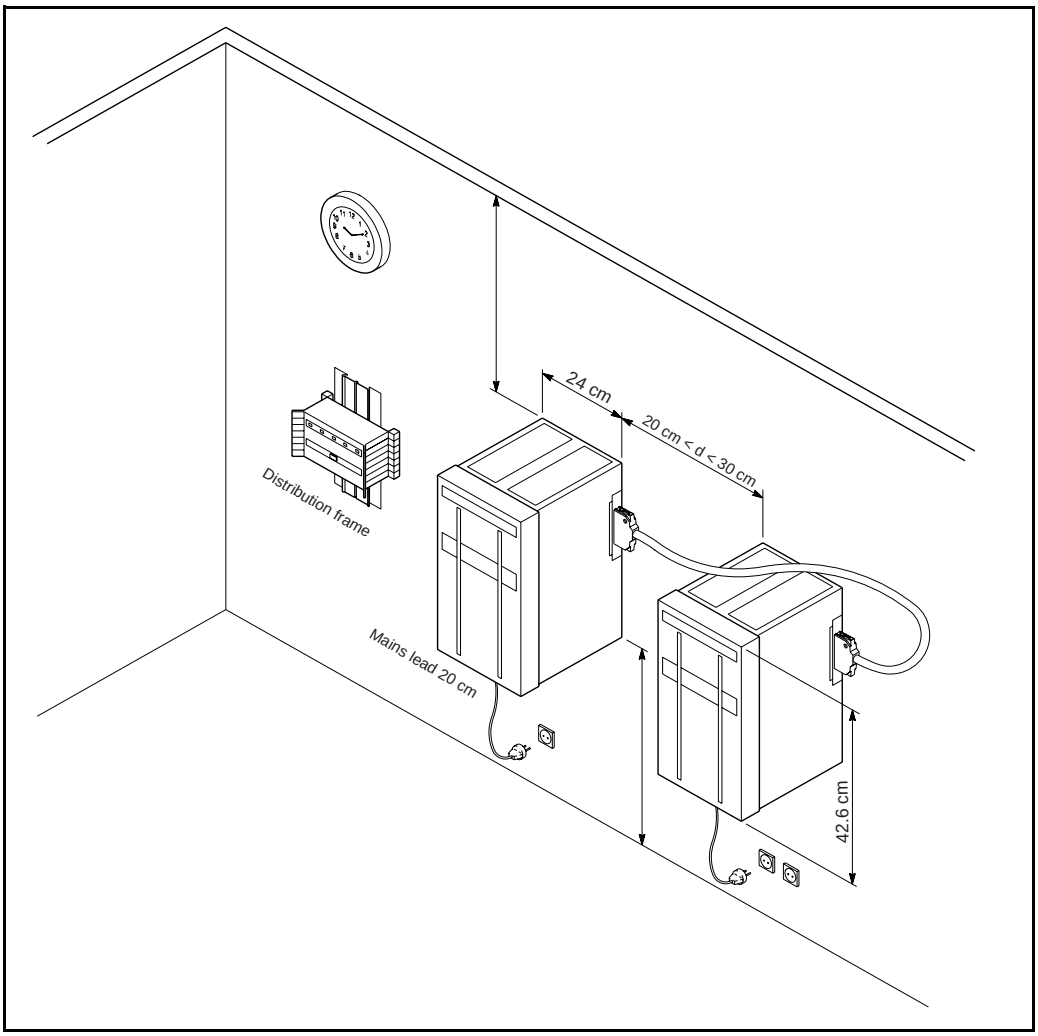
- Temperature

  The temperature of the room must be controlled, and kept between 5 °C (41 °F) and 40 °C (104 °F).

- Humidity

  The degree of non-condensing humidity in the room must remain between 10 % and 80 %. The humidity must not exceed 30 % per hour during operation.

Space



Electrical power supply

At the installation point, three power sockets should be provided for the main and secondary cabinets and the programming terminal. Each socket must be capable of carrying the rated voltage of 230 V at 50 or 60 Hz at a current of 10/16 A and must have a third, grounding conductor for protection against electrical discharges and shock, and to prevent electromagnetic interference. The power outlets installed must comply with the standard NF C-15100.

Protection against electric shock

For the safety of the installers, the ICS must be connected to a 3-wire power point connected to the general earth for the building.
Use only three-conductor (male and female) connectors: two phase conductors and one earthing conductor.

Power points should also be provided for the optional equipment.

Note: *Do not use an extension cord between the electrical outlet and the ICS power supply unit.*

Equipment checklist

The customer may wish to install existing equipment. To obtain a general idea of the scale of the new installation, you should make a complete inventory:

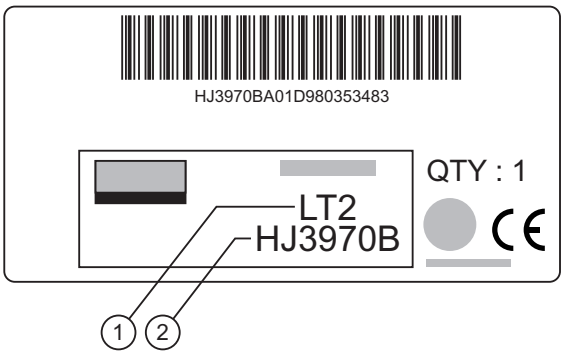
Existing equipment

If the customer has equipment to install, draw up a hardware inventory of all the equipment supplied by the customer and note the detailed information required for programming in the *Programming Record*. For example, the customer may supply a common bell device and an external musical source.

New equipment

Equipment for the new system will be delivered in individual boxes. To complete an inventory of the delivered equipment, look for the package labeling and enter the details in the *Programming Record*.

An example of the labeling on the packages is given below:



Legend:

1- Product description

2- Product sales code

Tools for installation

To install the ICS, you will need the ordinary set of tools common to any telephone installation, as well as the following:

- 1 pair of adjustable pliers for wiring the Stocko insulation-displacement connectors
- 1 insertion tool for the MDF (reference PW1007A)
- 1 programming terminal, for example a PC running in VT 100 emulation mode or a VT 100 console
- 1 serial cable to connect the VT 100 programming terminal to the ICS via the main distribution frame
- 1 drill and a set of drill bits to fix the cabinet to the wall

High leakage currents

In the event of a power line fault near telephone lines, service technicians must be aware of the possibility of high leakage currents on metal system surfaces.
Leakage currents normally flow safely through the power cord to protective ground.

Isolate the telephone network lines before any servicing on the ICS.

Lightning overvoltages

Transient overvoltages due to lightning can be conveyed by the supply cables and telephone lines of the installation:

- the electrical power supply installation of the room must be protected against lightning-generated overvoltages coming from the power supply network
- the telephone installation must be protected against lightning-generated overvoltages by inserting protection modules between the PSTN and the distribution frame

Hardware installation procedure

The table below summarises the work involved in installing the du M6501L/R IP PBX hardware. The steps in the installation procedure are described below.

Installing the hardware	
1 Setting the cabinet in place	
➤ Unpacking the cabinet	Remove the M6501L/R IP PBX from its packaging.
➤ Installing the cabinet on its support	Use the wall mounting bracket to mount the cabinet.
➤ Fastening the cabinet to its support	Remove the power supply module and tighten the screw fully, locking it against the bracket.
➤ Connecting the cabinets	Connect the two cabinets together using the cable supplied with the expansion cabinet.
2 Installation of cards	
➤ Installing the basic cards	Install the optional PROMs then install the daughter cards on the OCT4 card
➤ Installing the ISDN cards	Install the ISDN S/T PRI cards then the S/T BRI cards
➤ Installing the tie line cards	Install the cards used for private trunk line connections
➤ Installing the PSTN cards	Install the cards used for analogue trunk line connections
➤ Installing the LAN cards	Install the PT2 card for LAN connections
➤ Installing the application cards	Install the application cards: integrated router, V24 interfaces, etc.
➤ Installing the equipment cards	Install the cards used for equipment line connections: analogue and digital terminals
3 Wiring to the LAN network	Wire the PT2 card to a 10/100 Mbits Ethernet LAN outlet
4 Wiring the distribution frame	
➤ Wiring the ISDN interface	Wire the ISDN S/T access points
➤ Wiring analogue trunk lines	Wire the analogue trunk lines (PSTN)
➤ Wiring the TLs	Wire the private trunk lines (tie lines)
➤ Connecting digital sets	Connect the digital telephone sets
➤ Connecting analogue terminals	Connect the basic sets
➤ Connecting EDP terminals	Connect the synchronous and asynchronous EDP terminals (RS232C)
➤ Connecting miscellaneous equipment	Connect the miscellaneous equipment: general bell, programming console, etc.

- Folio 1 de 2 -

Installing the hardware	
5 Power on preparation	
➤ Grounding	Connect the cabinets and distribution frames to the building's ground network.
➤ Battery installation	Install and connect the installation's backup batteries
➤ Fitting the cabinet cover(s)	Always replace the cabinet cover before switching on power

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Setting the cabinet in place

This section describes how to set the cabinet in place on its wall mount. This procedure applies to M6501R IP PBX and M6501L IP PBX cabinets, because they are identical.

At each stage of the installation, make sure the equipment has not been damaged in any way. If it has, return it to the supplier.

To put a cabinet in place:

- unpack the cabinet
- install the cabinet on its support
- fasten the cabinet to its support

CAUTION

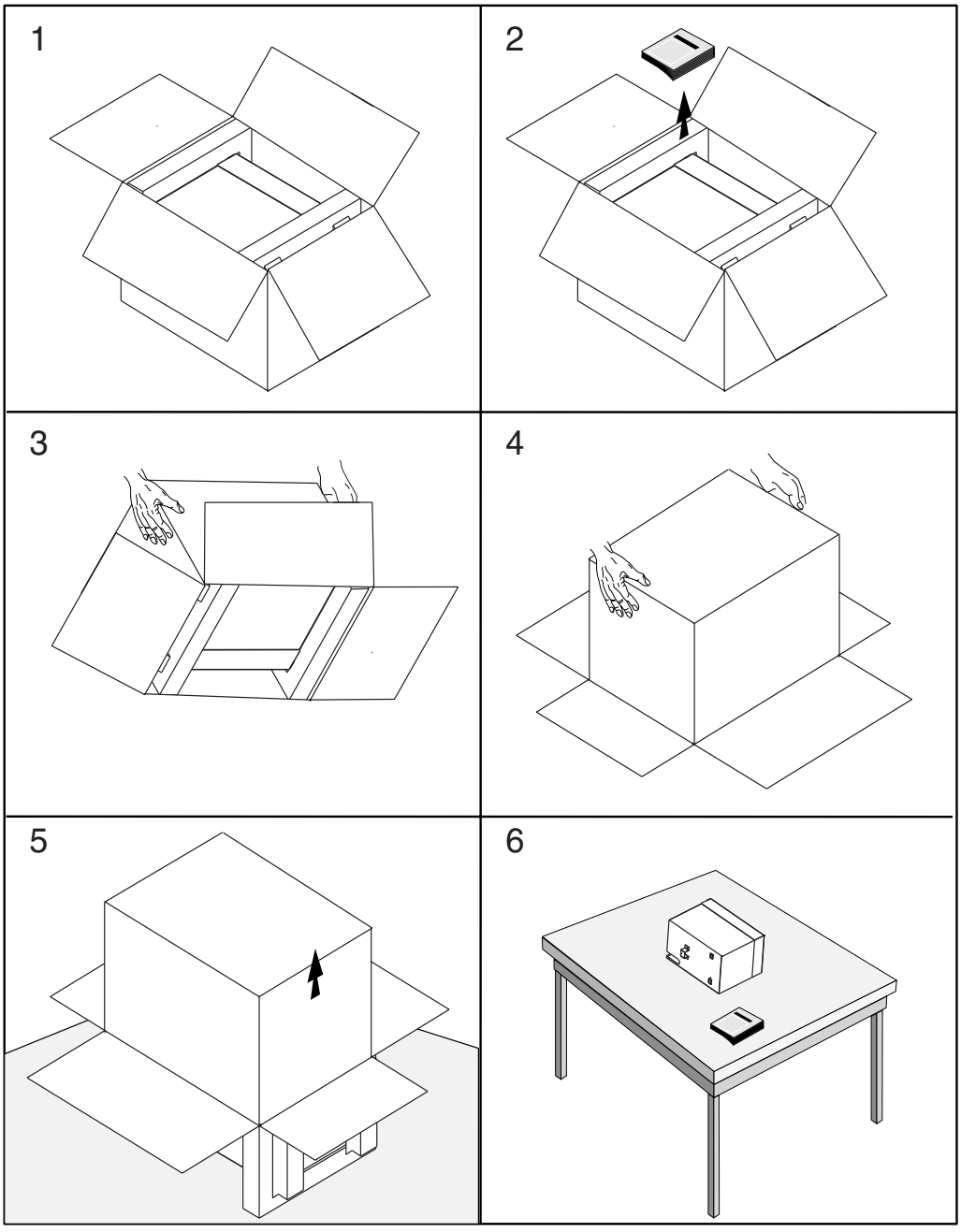
Make sure you have enough room to unpack all the equipment and store it safely during the installation procedure.

Unpacking the cabinet(s)

To remove the M6501L/R IP PBX cabinet from its packaging:

1. Place the box on the ground. The ground must be clean and dry. Open the box.
2. Remove the documentation from the box.
3. Tip the box onto one side.
4. Place the opening facing the floor.
5. Raise the packaging carton. Save the fully-recyclable box (standard 2809) for any subsequent shipment of the equipment.
6. Remove the cabinet's side padding, replacing it in the box, then place the unit on the table.

The diagram below shows the unpacking sequence for an M6501L/R IP PBX cabinet:



Checking the cabinet contents

Each M6501L/R IP PBX box contains a cabinet. A cabinet weighs about 18 kg and contains:

M6501R IP PBX	M6501L IP PBX	
	Main cabinet	Expansion cabinet
➤ ADS 150 power supply module	➤ ADS 300 power supply module	➤ ADS 300 power supply module
➤ integrated battery module	- -	- -
➤ OCT4 card	➤ OCT4 card	➤ ROCT3B card
➤ OCT4 distribution cable	➤ OCT4 distribution cable	- -
➤ power cord	➤ power cord	➤ power cord
➤ insulation-displacement stocko connectors	➤ insulation-displacement stocko connectors	➤ insulation-displacement stocko connectors
- -	- -	➤ bus extension cable

Note: *Retain the packaging (box and packing materials), in case the ICS ever has to be moved.*

Installing the cabinet on its wall mount

The cabinet is mounted on a bracket that you must first fix to the wall. For each cabinet you will need four wall plugs suitable for the type of wall.

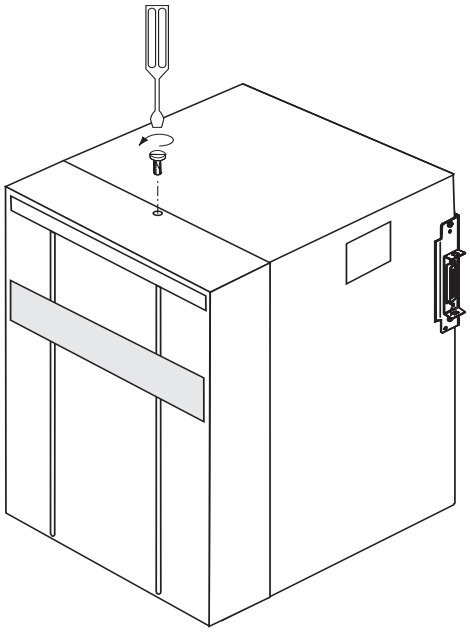
Cabinets must be mounted vertically, at human height to facilitate access to the equipment and not more than 1.70 m (5 ft 6 in) from the power-supply socket. For esthetic reasons, the cabinet should be offset 5 cm (2 in) to the left of the mains power point.

Leave enough clearance above the cabinets to enable the cover retaining screw to be replaced.

Note: *Retain all screws and metal objects from the cabinets in a safe place for later use.*

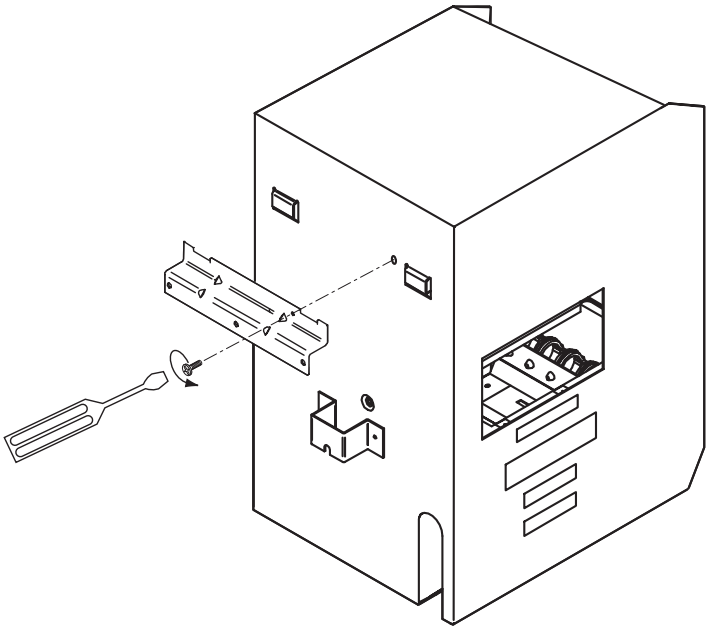
To install the cabinet on its wall mount:

1 Remove the cover retaining screw on the top of the cabinet.



2 Remove the cover. Remove the power cord and the OCT4 main distribution cable from the main cabinet.

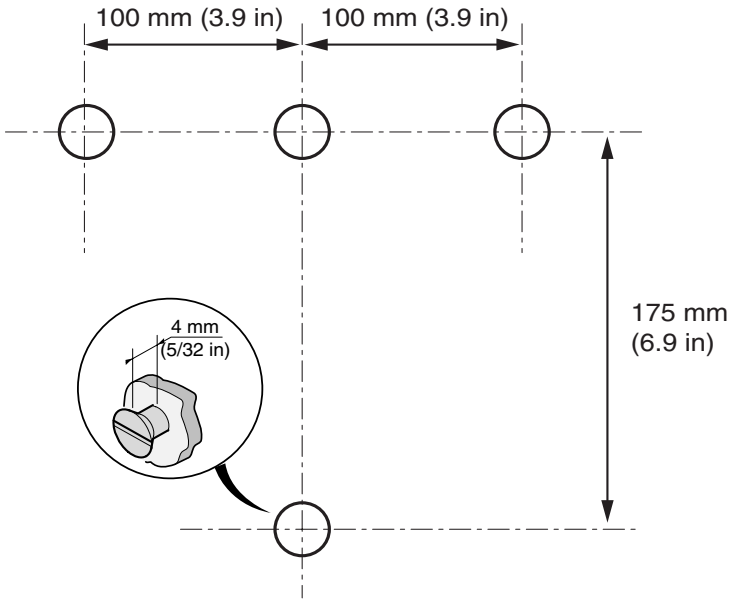
3 Remove the wall mounting bracket at the back of the cabinet.



4 Use this bracket as a template to mark three drill holes on the wall.

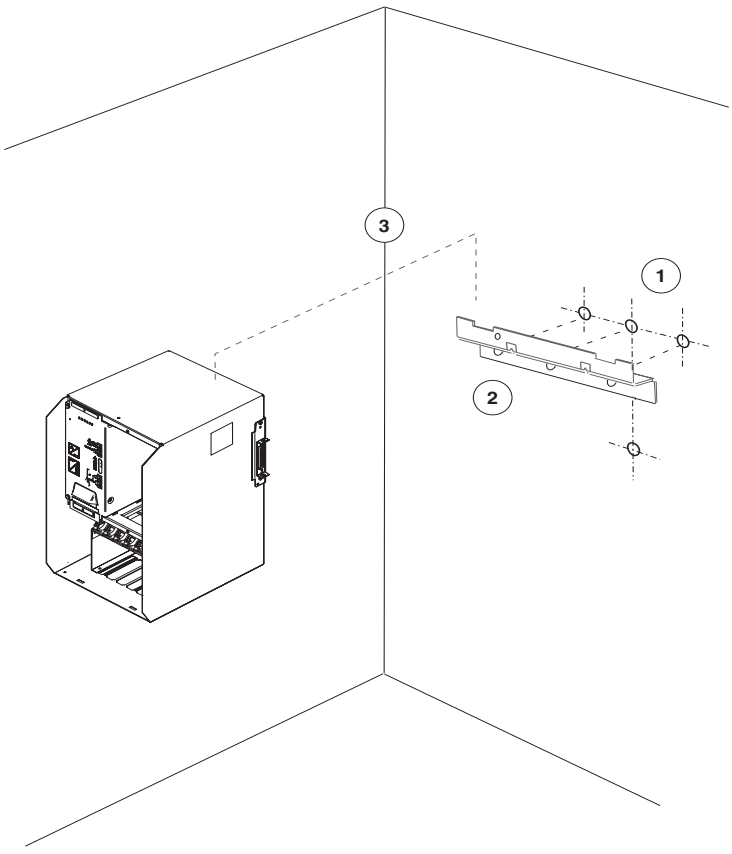
5 Take measurements to identify and mark the position of the fourth screw.

6 Drill the holes. Insert four wall plugs suitable for the type of wall. Phase 1 in the diagram below.



7 Fix the bracket to the wall with three of the screws.
Fit the fourth screw, leaving 4 mm (5/32 in) between the screw head and the wall. The fourth screw is used to fix the cabinet in place. Phase 2 in the diagram on the next page.

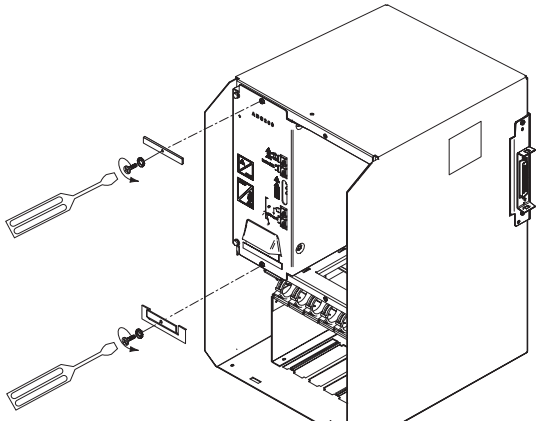
8 Place the cabinet on its wall mount as shown in phase 3 in the diagram below.



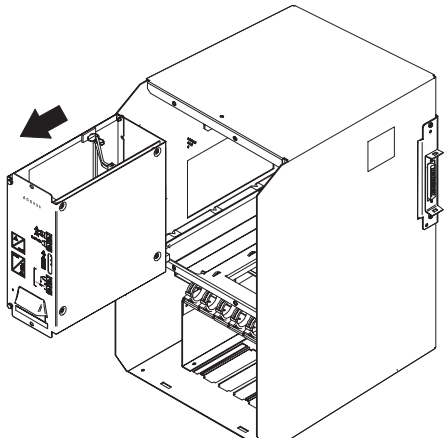
Fastening the cabinet to its support

1 Remove the connectors from the front panel of the power supply module.

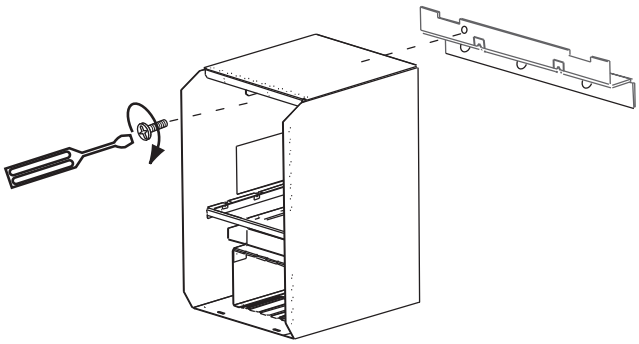
2 Unscrew the metal parts designed to steady the power supply module during shipping as shown below.



3 Remove the power supply module from the cabinet and place it on the table.



4 Inside the cabinet, insert the retaining screw and tighten it against the bracket as shown below.



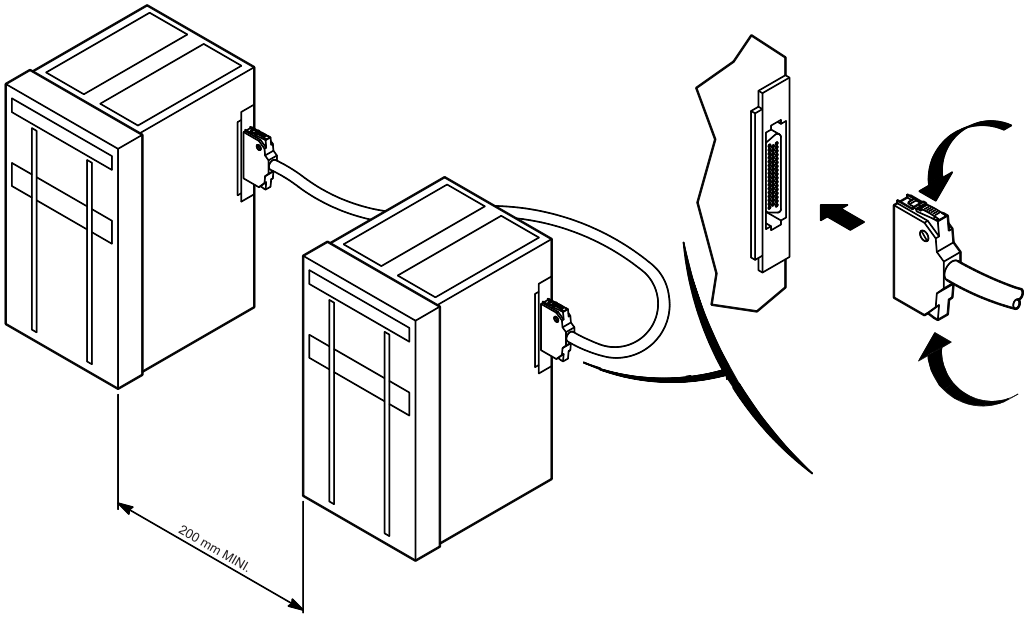
5 Refit the power supply module, using the appropriate screws to fix it in place.

6 Replace the connectors on the front panel of the power supply module.

Connecting the M6501L IP PBXcabinets

In a two-cabinet configuration, the bus extension cable is used to connect the two cabinets together.

Connect the two cabinets and fit the connectors firmly in place on the unit, as shown below:



Identifying cards

Power to the equipment must be switched off when inserting or removing cards.

There are four different card families:

- basic cards for control, switching, tones, and announcements
- network cards for connection to the PSTN and ISDN public telephone networks, Ethernet local area network, public data and private networks
- application cards: data transmission, software downloads, and telephony-based applications (voice mail, remote control functions, synchronous greeting messages, etc.)
- equipment cards for connecting terminals and extensions.

You are recommended to install the basic cards first, followed by the network cards, then the application cards and lastly any equipment cards.

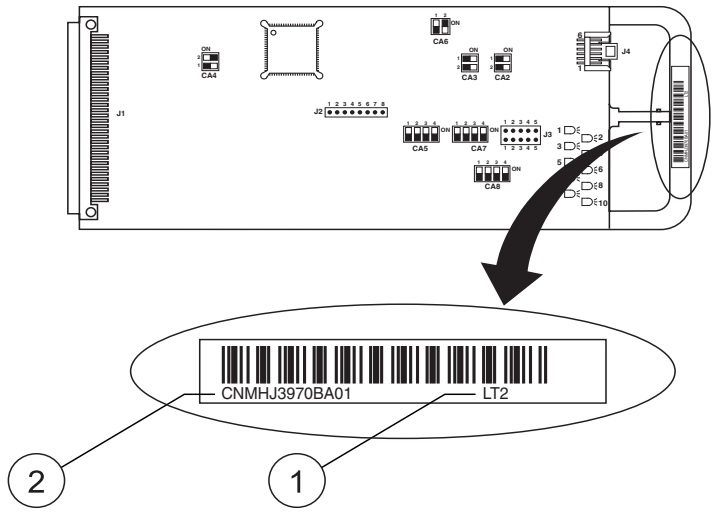
Note: *Shelf 0 in the main cabinet has six synchronised positions. You are recommended to only install network cards and application cards in this shelf.*

Identifying cards

Refer to Appendix A for a full description of the cards.

Each card has a label bearing its identification code, approval level, and warranty level. The label does not specify the card's function. After removing the packaging, configure the jumper switches correctly and insert the card in the appropriate slot.

Note: *If a card is damaged, return it to the supplier with a description of the problem.*



Legend:

1- Card name

2- Sales code

Place the card on its antistatic envelope and set the switches correctly before inserting it in the right slot in the ICS.

Basic cards

Card	Overview
OCT4	Main card. This card can be fitted with two daughter cards: TMOCT4 and VOCT3 One card per M6501L/R IP PBX system.
ROCT3B	Bus interface card for the expansion cabinet. This card functions as controller/receiver of various signals, adjusts any cable lag and controls the PCM bus. This card has 16 digital lines. It is only fitted in the M6501L IP PBX expansion cabinet. One card per M6501L IP PBX system.
TMOCT4	Available in two versions: with or without memory extension. This card has an additional signal processor identical to that of the OCT4 I card. It must be installed on the OCT4 card.
VOCT3	Voice prompt and music-on-hold. This card can be fitted with one or two PROMs: pre-recorded messages and music-on-hold. This SRAM memory can be used to memorise a new 64-second greeting message. It must be installed on the OCT4 card.

ISDN cards

Card	Overview
LS1	ISDN BRI (2B+D) This card can be used as an ISDN basic rate interface (T0) or as an ISDN line interface (S0). It contains either two T0 and two S0, or one T0 and one S0.
LD4	Four ISDN BRI (2B+D) interfaces. This card can be used as an ISDN basic rate interface (T0) or as an ISDN line interface (S0) for connecting DECT base stations.
LD4N	Four ISDN BRI (2B+D) interfaces. This card can be used as an ISDN basic rate interface (T0) or as an ISDN line interface (S0) for connecting DECT base stations.
LT2	ISDN PRI (30B+D) This card can be used as a PRI trunk access or as a digital PCM trunk. The ISDN PRI consists of thirty 64 Kbps channels and one 128 Kbps D channel. The LT2 card can be used for TL/QSIG links.

LAN access network card

Card	Overview
PT2	CLX interface card for an IEEE 802.3 compliant 10/100 Mbits Ethernet LAN; the card provides a TCP/IP-X25 gateway and IP tunneling functions. It can be fitted with a VOIP4 or VOIP4 Edaughter card to manage 8, 16, or 32 voice over IP circuits.

Analogue network card

Card	Overview
LR4	PSTN card with four trunks (analogue signalling) This card provides a remote set disconnection detection function. The LR4 card must sometimes be fitted with DTOC cards, depending on the specific configuration.

Digital network cards

Card	Overview
LT2	This card is used as a PCM digital junction or to provide ISDN PRI access. The PCM digital interface can have 32 channels (time slots) operating at 2 Mbps.
LI1	This card has two tie line circuits and can be wired for two-wire or four-wire operation.

Application cards

Card	Overview
CA1	This card has four RS232C ports enabling the connection of four asynchronous data transmission terminals (DTEs) in V28 and/or V10 mode. The four circuits provide a data communication terminal equipment (DCE) function. This card can be fitted with up to four DTEs in V10 mode.
CP1	This card has two circuit packet-switching lines; it is used for the X.25 protocol (data packet transmission).
CS1	This card has two RS232C ports enabling the connection of two synchronous data transmission terminals (DTEs) in V28 and/or V10 mode. This card can be fitted with up to two DTEs in V10 mode.
FTXA	12 kHz charge detection card. This card is used to detect call charging pulses. This card is mounted on an LR4 card for each trunk.
FTXC	50 Hz charge detection card. This card is used to detect call charging pulses. This card is mounted on an LR4 card for each trunk.

Equipment cards

Card	Overview
LA4, LA8	These cards provide analogue equipment circuits: basic sets, answering machines, and any other type of analogue terminal. Loop resistance: 600 Ohms maximum The LA4 card has 4 lines of this type, and the LA8 has eight.
LN4, LN8	These cards are only used for dedicated digital telephones: -48 V, 2-wire, maximum length 1800 m (with a 0.6 mm cross-section wire). The LN4 card has 4 lines of this type, and the LN8 has eight.
LM4, LM8	Digital and analogue equipment line card. These cards manage digital and analogue lines simultaneously. The LM4 card has 2 digital lines and 2 analogue lines. The LM8 card has 4 digital lines and 4 analogue lines.
LS1	This card is used to connect terminals fitted with an ISDN S0 BRI adapter card.
LD4, LD4N	This card is used for connecting DECT base stations.
MVD	This card provides the voice mail functions. Refer to the M7460 Integrated voice mail installation management manual (MCPS8933BBAAB01).
BVF	This card includes the M7455 Voice Answering Services function. Refer to the BIP Message voicemail card installation and implementation guide (PS8965BDA).

Expansion cards

Card	Overview
i-MUX 01	This card manages call multiplexing. Refer to the i-MUX 01 card Installation and Implementation Guide (PS8913BAA).

Note: *For instructions on installing and using the MVD, BVF and i-MUX 01 cards, refer to the relevant individual documentation. These items are not discussed further in this document.*

Installing basic cards

The main card in the M6501L/R IP PBX is the OCT4 card in the main cabinet. It is designed to accommodate daughter cards (TMOCT3 and VOCT3). Installing the basic cards consists in equipping the VOCT3 card with (optional) PROMs and mounting the (optional) daughter cards on the OCT4 card.

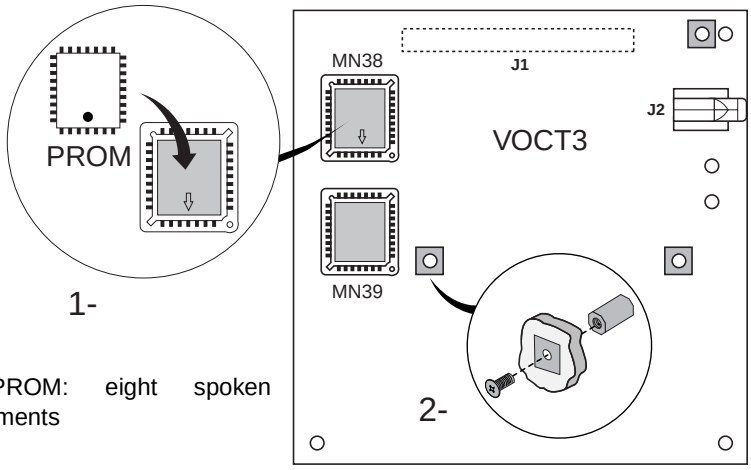
The OCT4 card also has an internal battery that saves setup data; this battery must be put into service.

Installing a PROM

The VOCT3 card can be fitted with one or two additional PROMs; if used, these PROMs should be fitted before mounting the VOCT3 card on the OCT4 card.

Unpack and install each PROM separately, to ensure they are fitted in the right place.

The PROMs and the VOCT3 card have a mark to show the right slot. When installing PROMs, line up the marks as shown in the diagram below:



MN38 PROM: eight spoken announcements

Legend:

1 - Line up the marks on the PROM and the connector on the VOCT3 card. Gently push down on the PROM until it clicks into place.

2 - Tighten the special screws supplied with the VOCT3 card before installing it on the OCT4 card.

Installing daughter cards on the OCT4 card

The OCT4 card can be fitted with TMOCT4 and VOCT3 daughter cards.

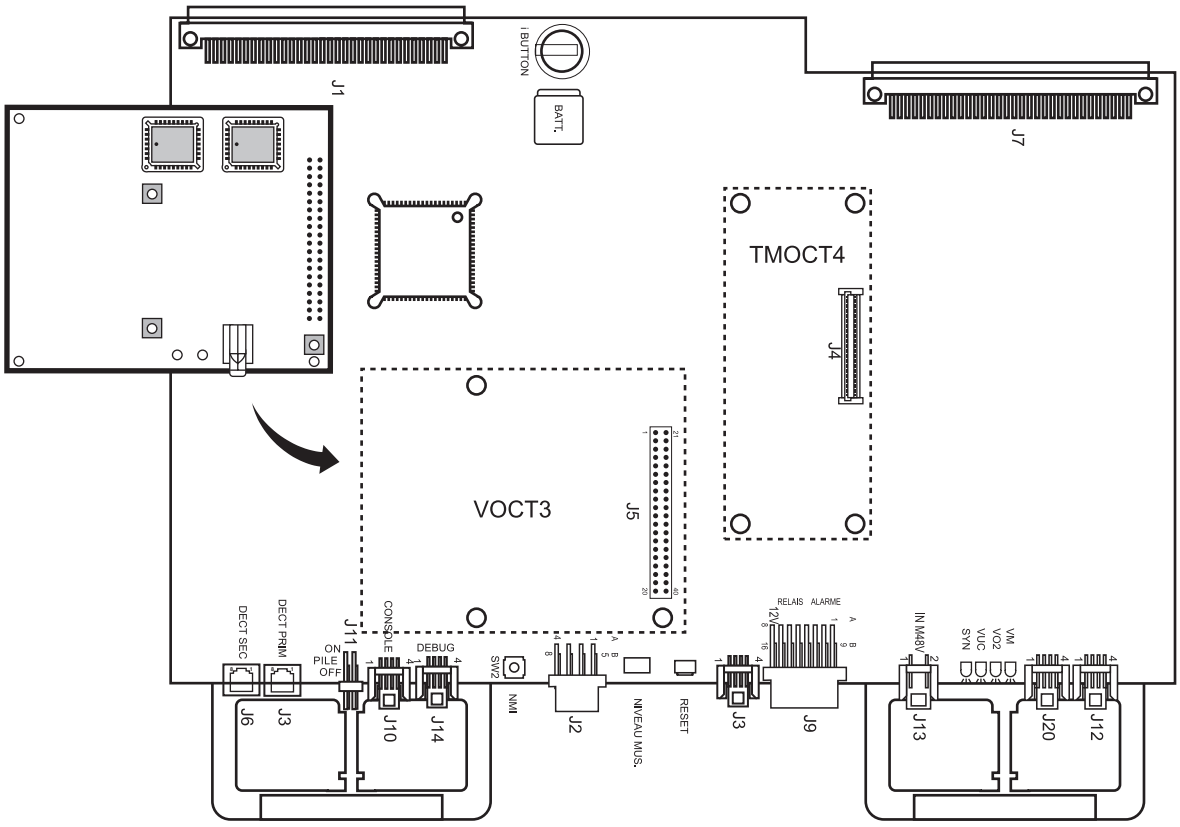
To install daughter cards:

1. Remove the OCT4 card:

   Disconnect the power cable for the digital equipment circuits on the OCT4 card (J13 connector printed IN M48V). Remove the OCT4 card from the cabinet.

2. Install the PROMs on the VOCT3 card if required, following the instructions given above.

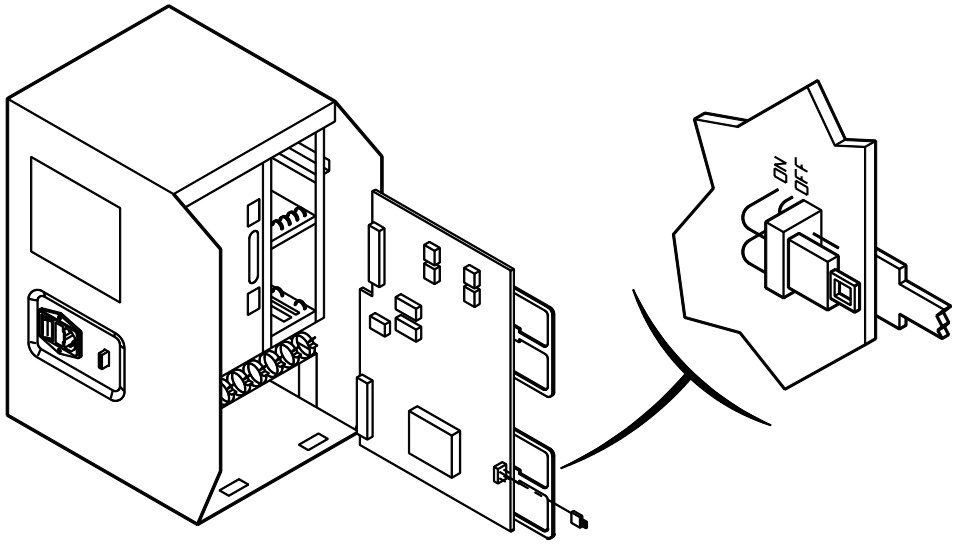
3. Install the daughter cards as shown in the diagram below.



Check the position of the internal battery

The internal battery is installed on the OCT4 card and can be used to save the system setup data. The battery switch is set to OFF while the OCT4 card is in storage.

Check that when installing it, the switch is set to ON, as shown in the diagram below.



Installing the ISDN cards

Installing the ISDN/T2 cards

The LT2 card handles a wide range of 2 Mbit frame formats, to suit customers' requirements according to their local PSTN exchange; switch settings are shown in Appendix A. The LT2 card is installed in shelf 0 in the main cabinet **only** and in the slots shown in the table below:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
LT2	YES	YES	NO	NO	YES	YES

When the LT2 card is installed in position 0 in shelf 0, you cannot also install the LA8, LM8, LN8, and LD4/LD4N double density cards (equipped with 1 or 2 ADPCM or 1 ADPCM16 cards in shelf 0).

Installing ISDN/T0 cards

LS1 card

Before installing an LS1 card, check the settings of switches SW1 and SW2 on the card. If an ISDN/T2 card is installed in slot 5 of shelf 0, the clock on the ISDN/T0 (BRI) card in slot 3 of the same shelf must be disabled. If an ISDN/T2 card is installed in slot 4 of shelf 0, the clock on the ISDN/T0 (BRI) card in slot 2 of the same shelf must be disabled.

The LS1 card is installed in the main cabinet in shelf 0 or shelf 1 **only** in the slots shown in the diagrams below:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
LS1	YES	YES	YES	YES	YES	YES

Card	Main cabinet - Shelf 1							
	0	1	2	3	4	5	6	7
LS1	NO	YES	YES	YES	NO	NO	NO	NO

LD4/LD4N cards

The LD4/LD4N cards are installed in the main cabinet in shelf 0 and shelf 1 **only** in the slots shown in the diagrams below:

Card	Main cabinet - Shelf 0					
	0	**1**	**2**	**3**	**4**	**5**
LD4/LD4N	YES	NO	YES	NO	YES	NO

Card	Main cabinet - Shelf 1							
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
LD4/LD4N	YES	NO	YES	NO	YES	NO	NO	NO

Installing the tie line cards

Installing the analogue TL cards

- The switches on LI1 with 2- or 4-wire E&M are: CA1 for equipment 0 on the J2 connector and CA2 for equipment 1 on the J3 connector.

LI1 cards are installed in the following slots:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
LI1	YES	YES	YES	YES	YES	YES

Card	Main cabinet - Shelf 1							
	0	1	2	3	4	5	6	7
LI1	YES	YES	YES	YES	YES	YES	YES	YES

Card	Expansion cabinet – Shelf 2					
	0	1	2	3	4	5
LI1	NO	YES	YES	YES	YES	YES

Card	Expansion cabinet – Shelf 3							
	0	1	2	3	4	5	6	7
LI1	NO	YES	YES	YES	NO	YES	YES	YES

Installing the digital TL cards

- Switch CA8 on the LT2 card sets the ISDN T2 (PRI) and PCM configuration, and switch CA4-1 controls the clock validation.

LT2 cards are installed in the main cabinet in shelf 0 **only** in the following slots:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
LT2	YES	YES	NO	NO	YES	YES

Installing the LAN cards

These cards are CLX expansion cards. They can only be fitted in the main cabinet.

The position of the PT2 cards in the main cabinet depends on the VOIP4(E) daughter cards, according to the following installation rules:

- if a PT2 + VOIP4(E)-16 card is installed, the following types of card cannot be installed in the next slot: LXX (LA8, LN8, LM8, CC1, etc.), LRX (LR4, LI1, etc.), MVD and LD4 + ADPCM or ADPCM16, LD4N + ADPCM16 (and vice versa)
- if a PT2 + VOIP4(E)-32 card is installed in slot 0 of shelf 0, LD4 + ADPCM or ADPCM16 LD4N + ADPCM16 and LXX cards cannot be fitted in slots 1 to 5

Note: *The installation rules for the bare PT2 card or PT2+VOIP4(E)-8 card are the same as for CX1 cards. The installation rules for the PT2+VOIP4(E)-16 card are the same as for LD4+2 ADPCM or LD4/LD4N+1 ADPCM 16 cards. The installation rules for the PT2+VOIP4(E)-32 card are the same as for LSX cards.*

Installing the LAN cards

The PT2 card fitted with the VOIP4 daughter card is installed in the main cabinet in shelf 0.

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
PT2, PT2+VOIP4(E)-8	YES	YES	YES	YES	YES	YES
PT2+VOIP4(E)-16	YES	NO	YES	NO	YES	NO
PT2+VOIP4(E)-32	YES	YES	NO	NO	YES	YES

Installing the analogue network cards

- These cards can be installed in any slot in shelves 0 or 1 of the main cabinet, except slots 0 and 4 in shelf 1.
- The LR4 switch settings are: SW2 for the call charging frequency and SW1 for the carrier line characteristics.

Three types of daughter card can be mounted on the LR4 card:

- a DTOC card for disconnection upon line release
- FTXA and FTXC cards for call charging

Installing an FTXA/C daughter card

A call charging pulse card can be installed for each trunk line on the LR4 card. These daughter cards are:

- the FTXA card detects 12 kHz charging pulses
- the FTXC card detects 50 Hz charging pulses

Installing the analogue network cards

LR4 cards are installed in the following slots:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
LR4	YES	YES	YES	YES	YES	YES

Card	Main cabinet - Shelf 1							
	0	1	2	3	4	5	6	7
LR4	NO	YES	YES	YES	NO	YES	YES	YES

Card	Expansion cabinet – Shelf 2					
	0	1	2	3	4	5
LR4	NO	YES	YES	YES	YES	YES

Card	Expansion cabinet – Shelf 3							
	0	1	2	3	4	5	6	7
LR4	NO	YES	YES	YES	NO	YES	YES	YES

Installing the application cards

- The switches on the CA1 card are used to set either V10 or V28 mode; the switches that need to be configured are SW1, SW2, SW3, and SW4.
- You do not need to set any switches on the CP1 card.
- The switches on the CS1 card are used to set either V10 or V28 mode; the switches that need to be configured are SW1 and SW2.

Application cards are installed in the main cabinet in shelf 0 or shelf 1 **only** in the slots shown in the diagrams below:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
CA1, CHP1, CP1 and CS1	YES	YES	YES	YES	YES	YES

Card	Main cabinet - Shelf 1							
	0	1	2	3	4	5	6	7
CA1, CHP1, CP1 and CS1	YES	YES	YES	YES	YES	NO	NO	NO

Installing the equipment cards

There may be lines for digital, analogue, and ISDN extensions, depending on the equipment card installed.

Installing the equipment cards

- You do not need to set any switches on equipment cards.

Equipment cards are installed in the following slots:

Card	Main cabinet - Shelf 0					
	0	1	2	3	4	5
LA4, LA8	YES	YES	YES	YES	YES	YES
LM4, LM8	YES	YES	YES	YES	YES	YES
LN4, LN8	YES	YES	YES	YES	YES	YES

Card	Main cabinet - Shelf 1							
	0	1	2	3	4	5	6	7
LA4, LA8	YES	YES	YES	YES	YES	YES	YES	YES
LM4, LM8	YES	YES	YES	YES	YES	YES	YES	YES
LN4, LN8	YES	YES	YES	YES	YES	YES	YES	YES

Card	Expansion cabinet – Shelf 2					
	0	1	2	3	4	5
LA4, LA8	YES	YES	YES	YES	YES	YES
LM4, LM8	YES	YES	YES	YES	YES	YES
LN4, LN8	YES	YES	YES	YES	YES	YES

Card	Expansion cabinet – Shelf 3							
	0	1	2	3	4	5	6	7
LA4, LA8	YES	YES	YES	YES	YES	YES	YES	YES
LM4, LM8	YES	YES	YES	YES	YES	YES	YES	YES
LN4, LN8	YES	YES	YES	YES	YES	YES	YES	YES

Wiring the distribution frame

Protection against line overvoltages

For a new system, it is advisable to use protection modules to protect against PSTN line overvoltages.
These modules are inserted between the PSTN and the system's distribution frame.

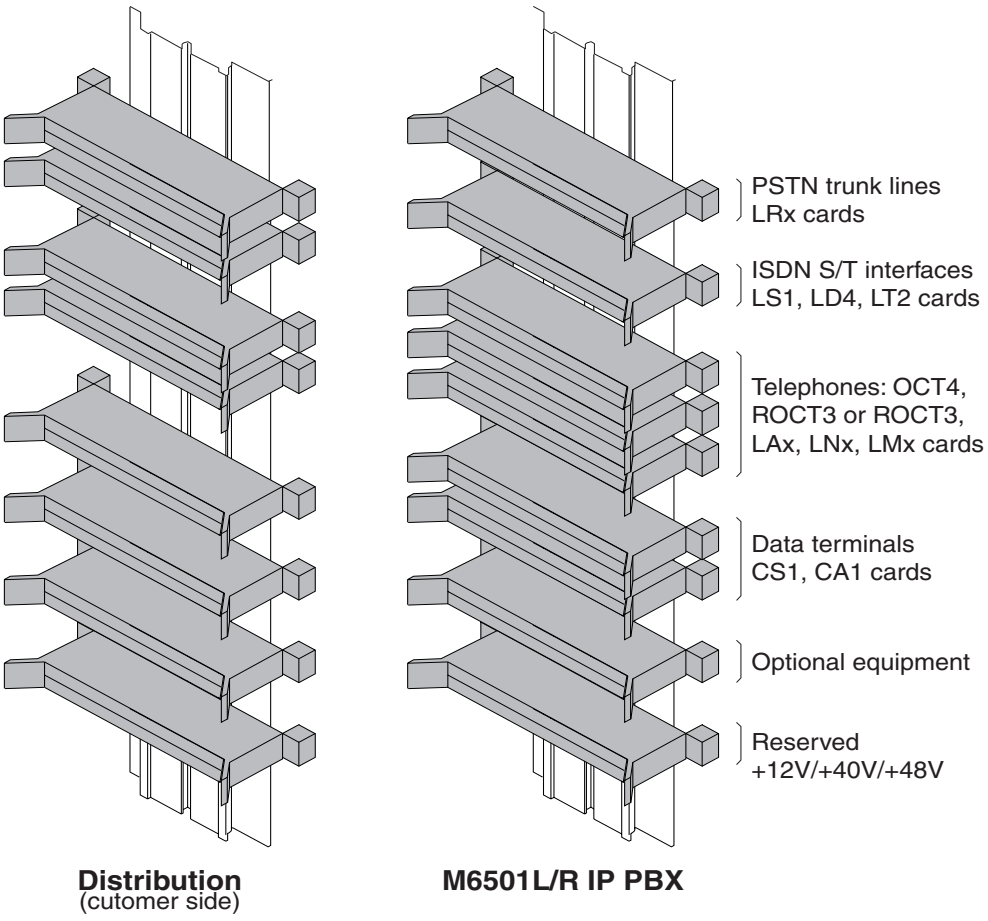
No dedicated wiring system is required for the M6501L/R IP PBX.

Nevertheless, you are recommended to use the Systimax Premises Distribution System. This system is designed to ANSI/EIA standards, and as such has ISO type characteristics suitable for wiring categories 1 to 5.

Note: *The principle for connecting equipment to the M6501L/R IP PBX is based on the use of telephone pairs for capillary wiring.*

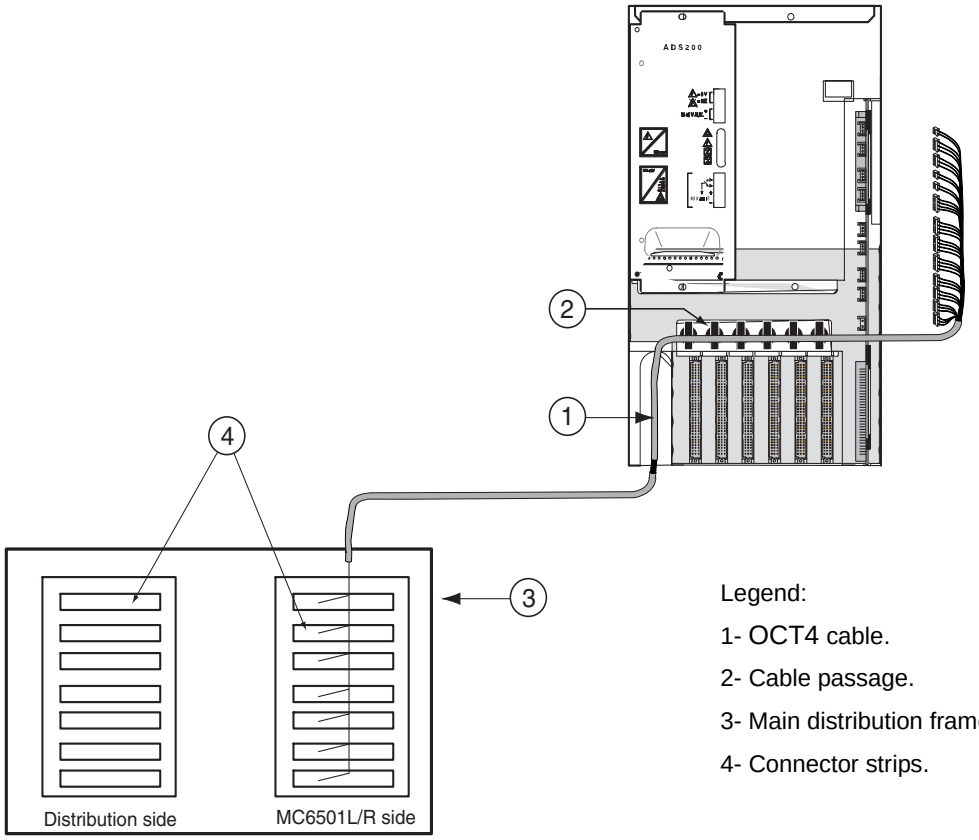
Organisation of the distribution frame

The system's distribution frame is made up of rails fitted with connector strips. An example distribution frame layout is shown below:



Connecting the M6501L/R IP PBX to the distribution frame

The OCT4 cable is supplied to simplify wiring the cards in the installation's distribution frame. It is a shielded twisted pair telephone cable. Insulation-displacement connectors are fitted to one end of the cable. Each connector has a label indicating the relevant connector on the OCT4 card.



Legend:

1- OCT4 cable.

2- Cable passage.

3- Main distribution frame.

4- Connector strips.

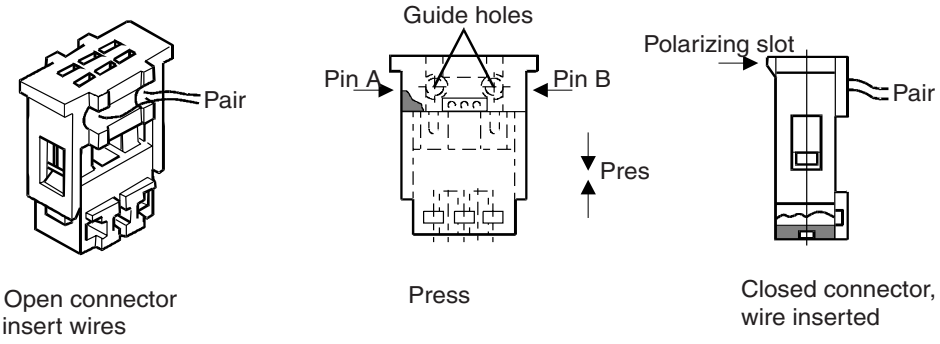
To connect the M6501L/R IP PBX to the distribution frame:

1 At the connector end, draw the OCT4 cable through one of the cable passages located on the right-hand side of the back panel of the cabinet.

2 Position the stripped braid between the clamping jaws. Ensure the electromagnetic continuity of the installation by tightening the two nuts that clamp the retaining strip around the cable.

3 On the M6501L/R IP PBX side: remove the plastic sheath from around the OCT4 cable in order to connect the devices on the cards installed.

4 Install the insulation-displacement connectors:
insert the wires to be connected into the guides provided (pin A and pin B). Exert pressure with gripping pliers when inserting the wires (insulation-displacement connections).



5 On the distribution frame side: strip the OCT4 cable.
Connect the telephone pairs to the connector strips:

Organisation of the OCT4 cable (HG 4177CA01)

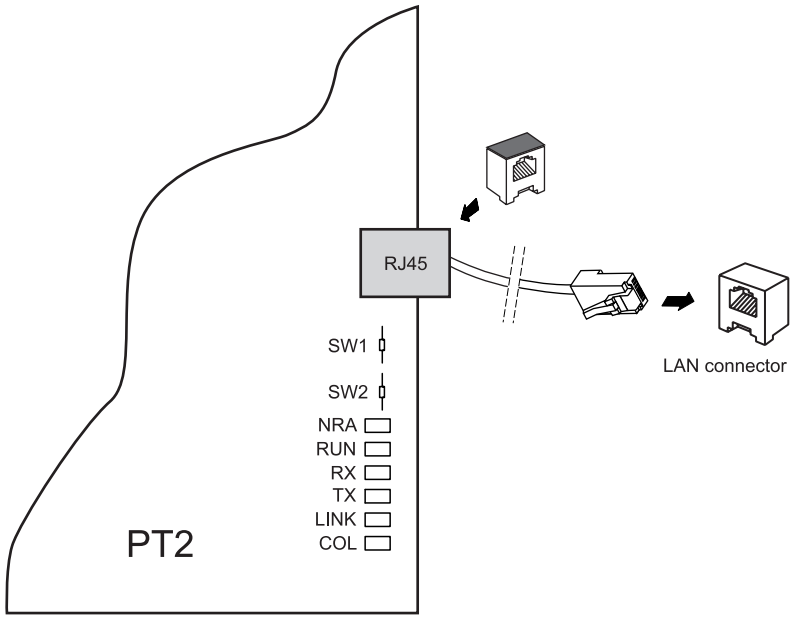
#	Colour	J2 (2x4 pins)	J9 (2x8 pins)	J10 (4 pins)	Signal	Function
1	gray white clear blue		A8 B8 A7 B7		JP12 GND R1A R1B	Relay 1 switching
2	gray yellow		A6 B6		R2A R2B	Relay 2 impaired operation
	clear brown		A5 B5		R3A R3B	Relay 3 restricted service (Common bell)
3	gray black		A4 B4		R4A R4B	Relay 4 alarm
	clear red		A3 B3		R2C GND	Relay 2 impaired operation
4	gray green clear white		A2 B2 A1 B1		NAL0 NAL1 NAL2 NAL3	UAD (for future use)
5	gray blue clear yellow	A2 B2 A1 B1			MUSA GND ETM GND	External music
6	gray brown clear black	A4 B4 B3 A3			TXD RXD GND DTR	Printer
7	gray red clear green			1 2 3 Not connected	RX2 TX2 GND	Programming console (VT 100)
8	orange white purple blue				Not connected Not connected Not connected Not connected	

Wiring the local area network (LAN)

The PT2 card has an interface for an Ethernet/IEEE 802.3, 10/100 Mbit LAN. It provides a TCP/IP-X25 gateway, plus IP tunneling and voice over IP functions (provided a VoIP daughter card is installed).

A description of the PT2 card is given in Appendix A.

The PBX is connected to the Ethernet LAN by plugging the RJ45 connector of the PT2 card into an available LAN socket, as shown in the diagram below.



Wiring the ISDN interface

ISDN cards have a T, S or S/T interface at BRI (S0/T0) or PRI capacity (S2/T2).

The S/T interface can be configured to supply:

- one connection at reference point S to a terminal
- one connection at reference point T to the network

These cards also handle the packet-mode data transmission service on channel D between the network and a terminal.

You need 2 pairs to wire an ISDN interface: 1 transmit pair and 1 receive pair.

CAUTION

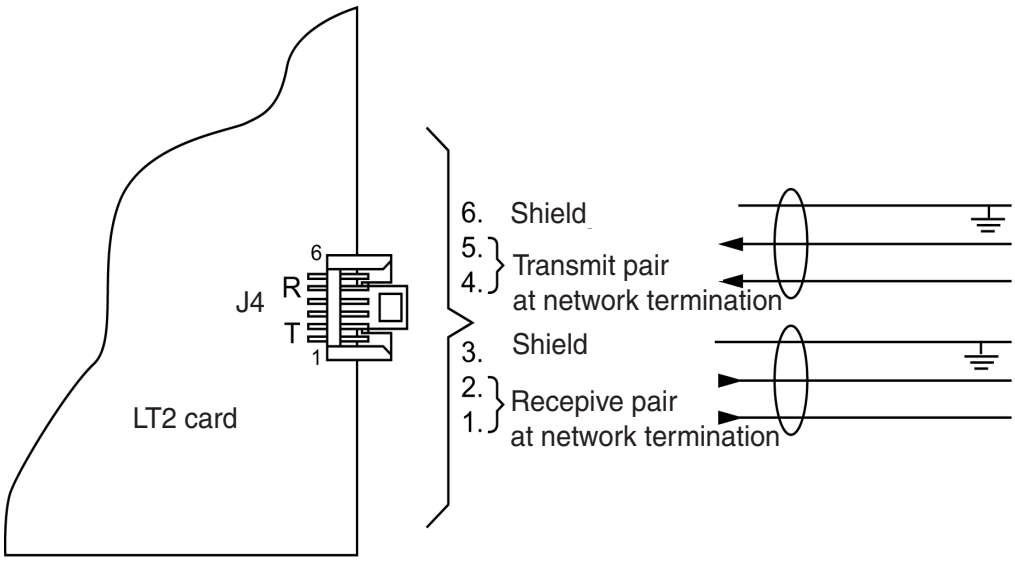
Make sure the polarity of the Tx/Rx pairs is correct.
The transmit and receive pairs are polarised. Make sure you do not reverse the polarities.
Two pairs are used to convey digital signals, one for each transmission direction. The pairs must not be mixed up.

Wiring the T2/S2 interface

Depending on its switch settings, the LT2 card can be used to set up a connection to the T2 or S2 reference point, thereby providing a speed of 2 Mbit/s (30B+D). Before beginning the wiring procedure, check the setting of switch CA8 on the card.

Note: *Use of T2 or S2 is confirmed during programming².*

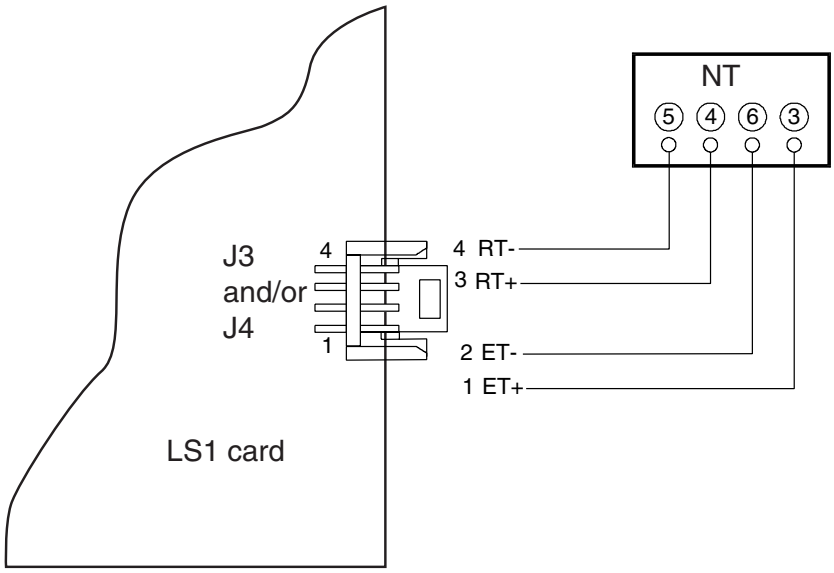
Each end of the L904-120 Ohm connection lead must be fitted with an ISO 8877 compliant male RJ45 connector. One end must be connected to the PBX ground or the telephone shielding.



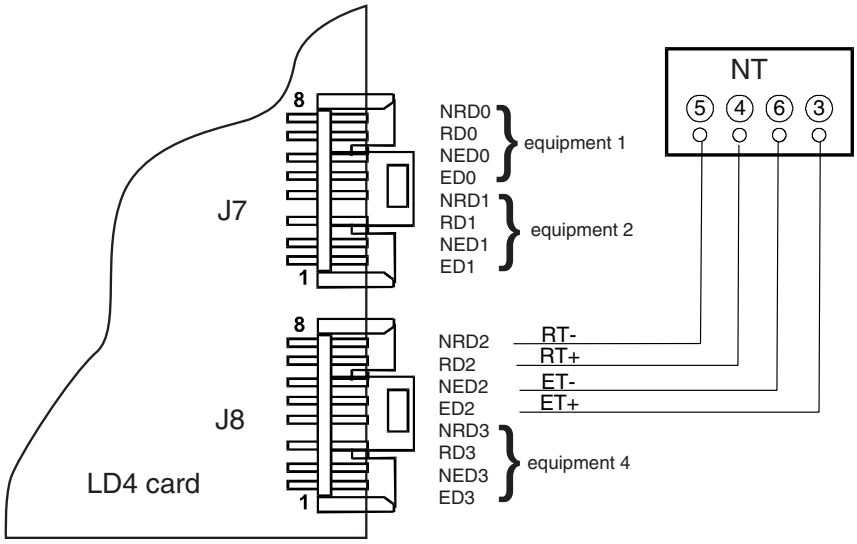
Wiring the T0 BRI interface

Depending on their switch settings, the LS1 and LD4 and LD4N cards can be used to set up two connections to the T0 and/or S0 reference points. One end of the connection lead must be fitted with an ISO 8877 compliant male RJ45 connector.

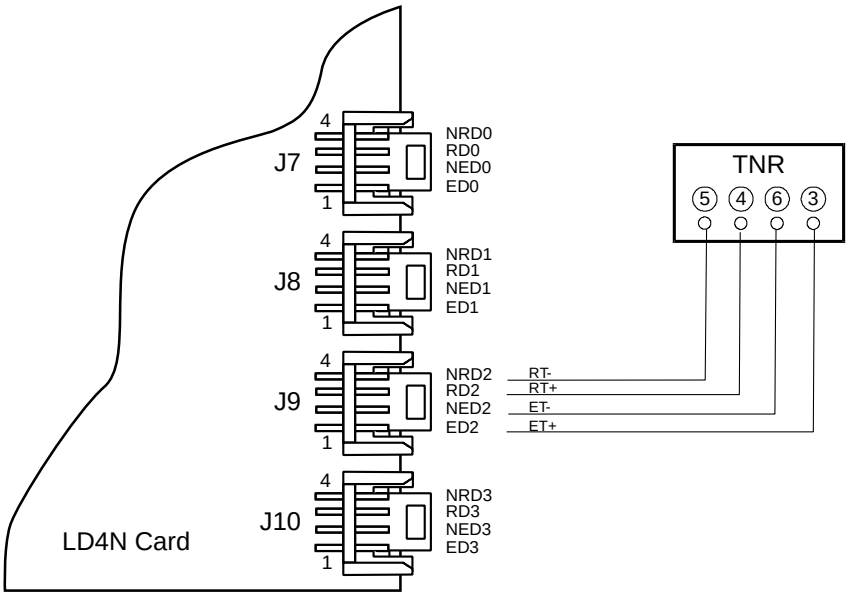
Note: *Before beginning the wiring procedure, check the settings of the switches on the card.*



Raccordement d'une interface T0 d'une carte LS1



Raccordement d'une interface T0 d'une carte LD4

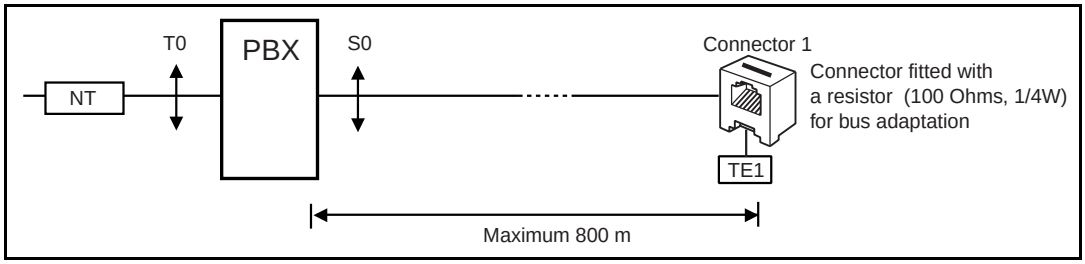


Raccordement d'une interface T0 d'une carte LD4

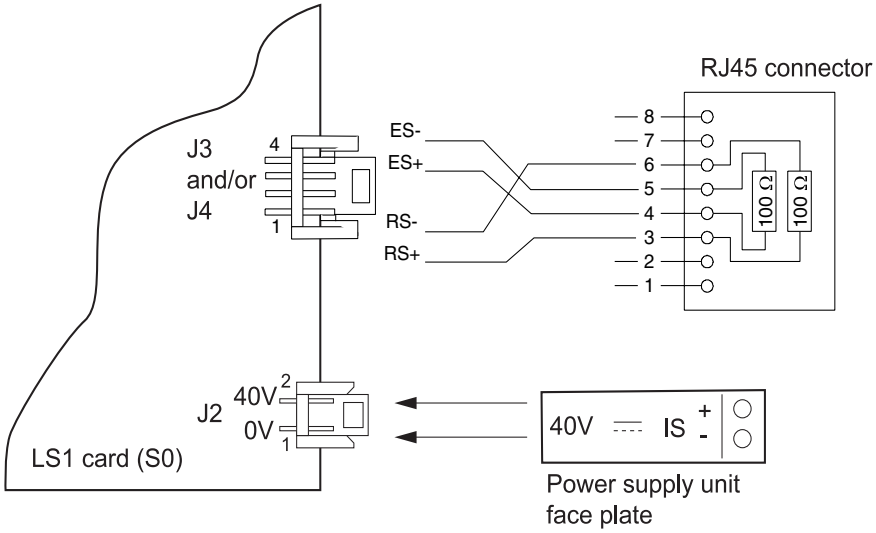
Wiring an S0 BRI bus

The S0 bus is a shielded two-pair cable. Depending on the bus length and topology, between one and eight female RJ45 connectors can be connected to it, for up to four ISDN/S0 (BRI) terminals.

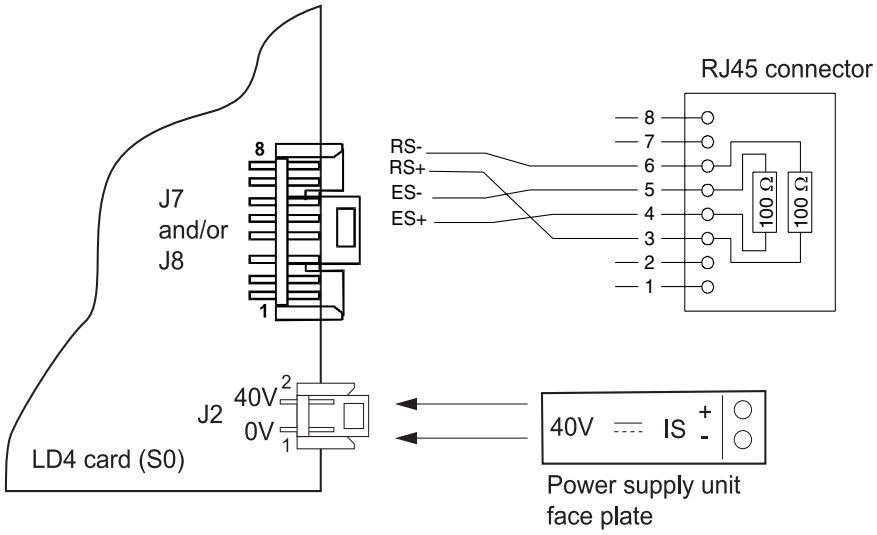
Long bus (point to point)



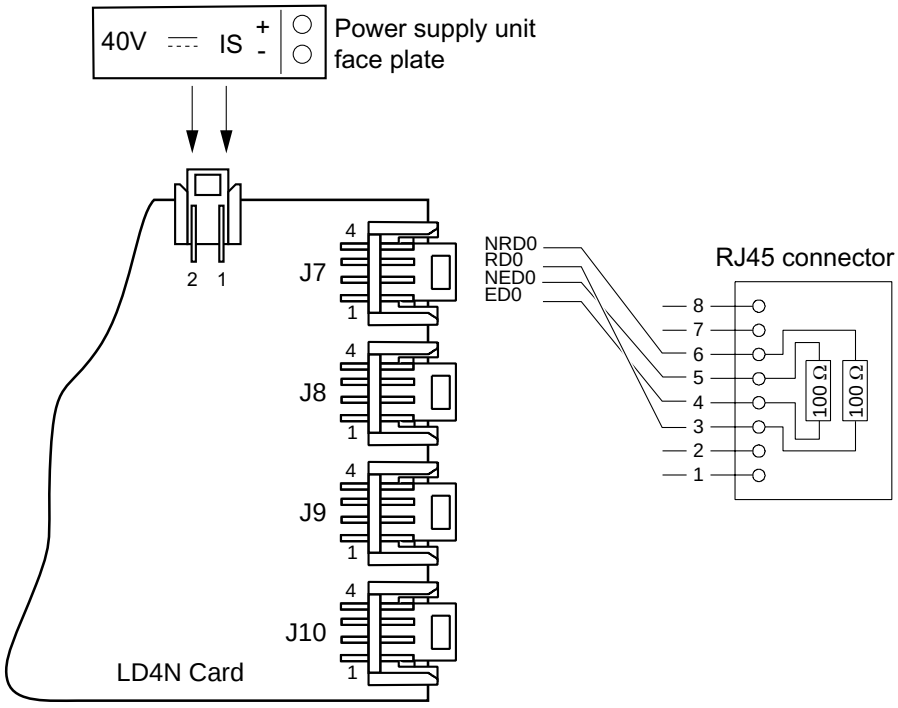
The S0 bus is connected to the LS1 and LD4 and LD4N cards and powered at 40 V by the power supply module as shown in the diagram below. The other end must be fitted with an ISO 8877 compliant male RJ45 connector.



Raccordement d'une interface S0 d'une carte LS1



Raccordement d'une interface S0 d'une carte LD4



Raccordement d'une interface S0 d'une carte LD4N

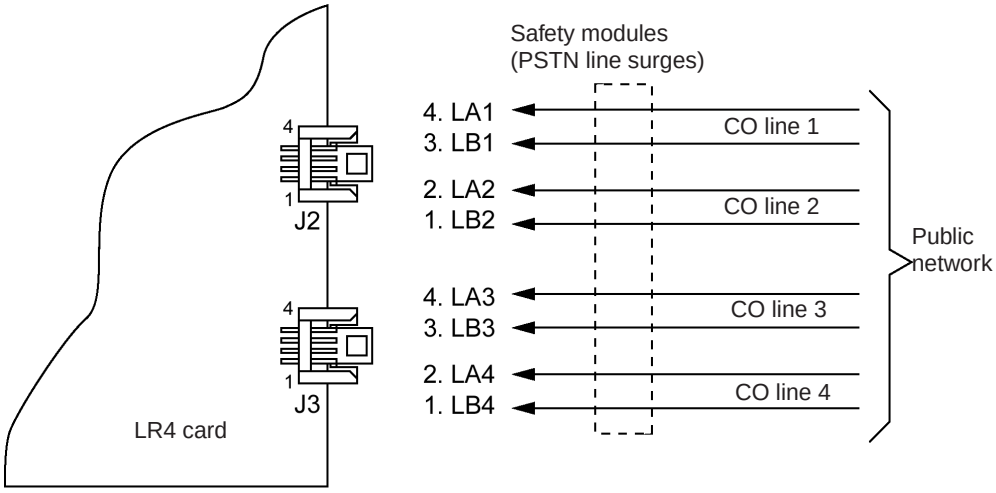
Wiring analogue trunk lines

The LR4 card allows the connection of four analogue trunk lines (TKs). This card handles signalling and the disconnection monitoring function. The release signal (polarity inversion) must be sent by the public exchange; the signal is detected by the LR4 card.

If the PSTN does not send this signal, the LR4 card must be fitted with a DTOC 'line busy' detection daughter card for each TK.

Note: *The basic LR4 card (with no DTOC) has the reference HJ2765BA and with a DTOC, HJ2765FA.*

Connecting a trunk



Wiring the LIX cards

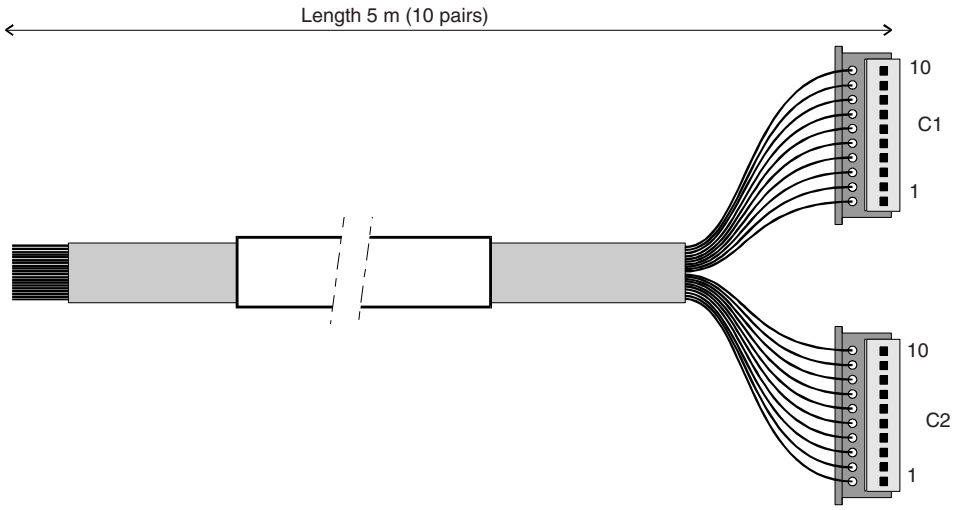
Tie lines (TLs) are private or leased lines used to inter-link two PBXs. There are two types of tie line:

- analogue (2-wire/4-wire), using the LI1 card
- digital (PCM or T0 QSIG, T2 QSIG)

The LI1 card with the reference HJ3950B can be used to connect two analogue tie lines. These analogue TLs are wired using either two or four wires:

- with a two-wire TL, voice communications are carried in both directions on the same pair (LA and LB)
- with a four-wire TL, one pair is dedicated to reception and the other pair to transmission

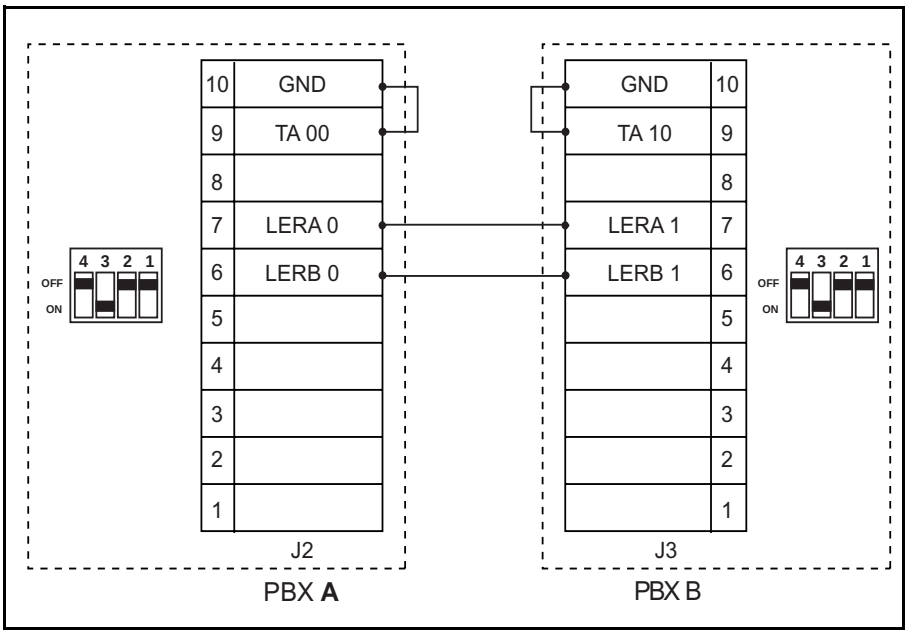
Note: *A connector lead with the reference HG4066A simplifies wiring analogue TLs on the LI1 card.*



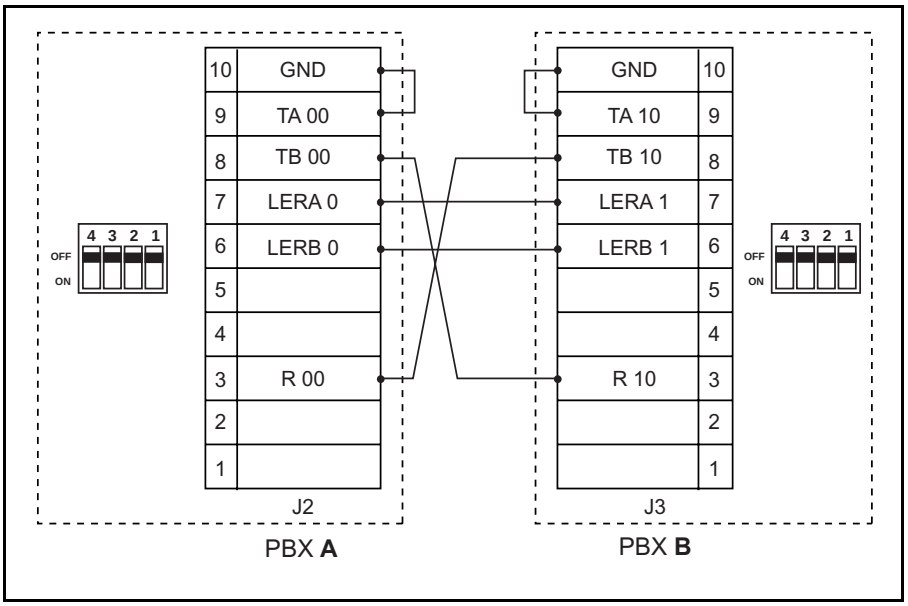
Wiring the LI1 card:

Colour	Connector	Signal	Description		Equipment on LI1 card
BeC	C1-1	T01		"Signalling" pairs	Equipment 0 (J2 connector on the LI1 card)
W	C1-2	R01			
BeC	C1-3	R00			
BL	C1-8	TB00			
BeC	C1-4	LRB0	"Voice" pairs		
Y	C1-5	LRA0			
BeC	C1-6	LERB0			
M	C1-7	LERA0			
BeC	C1-9	TA00			
N	C1-10	GND	Ground		
BeC	C2-1	T11		"Signalling" pairs	Equipment 1 (J3 connector on the LI1 card)
R	C2-2	R11			
BeC	C2-3	R10			
G	C2-8	TB10			
G	C2-4	LRB1	"Voice" pairs		
W	C2-5	LRA1			
G	C2-6	LERB1			
BL	C2-7	LERA1			
G	C2-9	TA10			
Y	C2-10	GND	Ground		

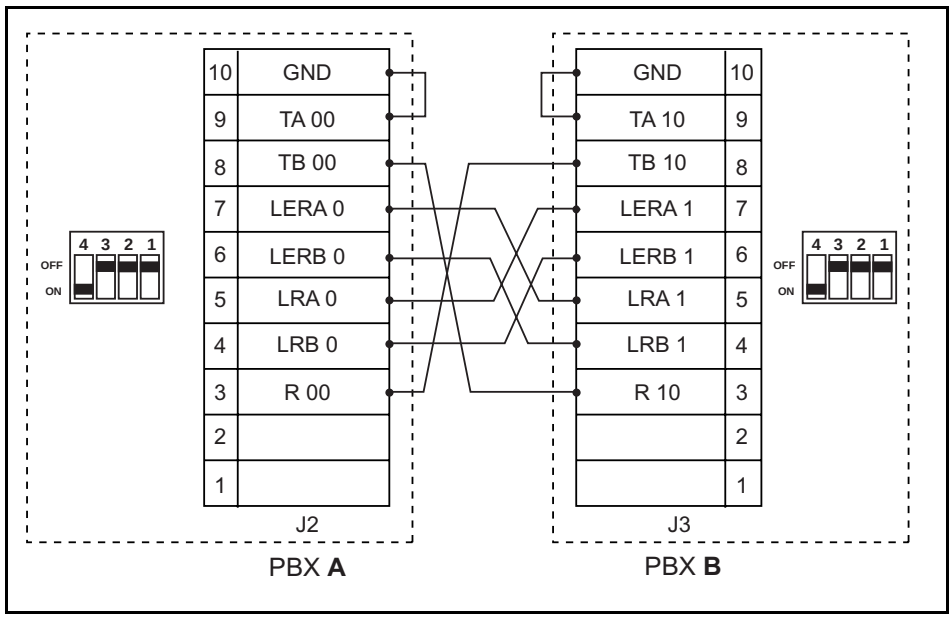
Wiring a 50 Hz 2-wire analogue TL



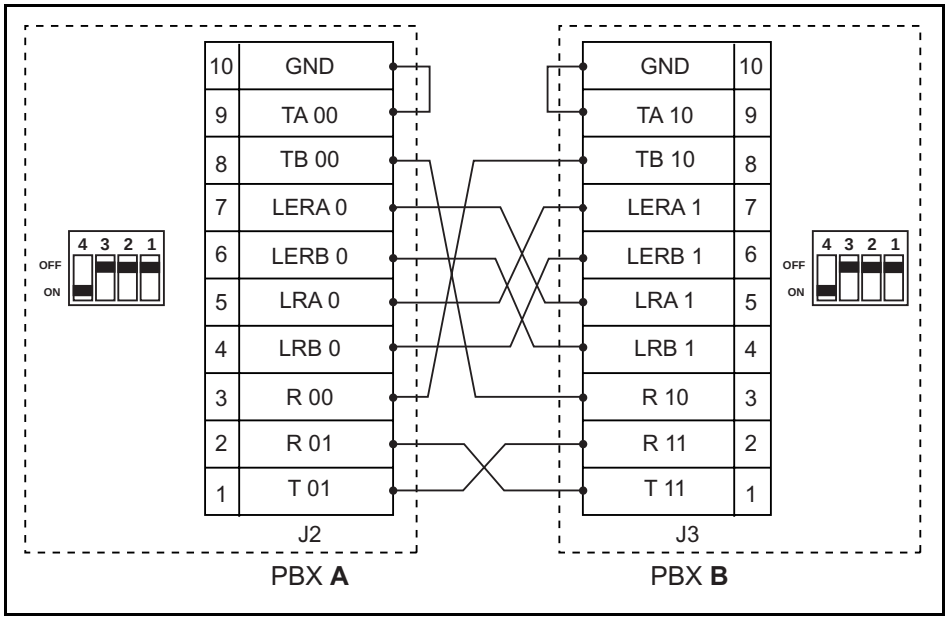
Wiring a 2-wire+E&M analogue TL



Wiring a 4-wire +E&M analogue TL



Wiring a 4-wire+2 E&M analogue TL



Connecting digital sets

Digital sets can be connected, via the distribution frame, to the following cards:

Cards	Connectors	Nb of lines
LN4	J2 and J3	4
LN8	J2, J3, J4, and J5	8
LM4	J4	2
LM8	J4 and J5	4
OCT4 (CPU card)	J12 and J20	4
ROCT3B	J4 to J11	16

Constraints with digital sets:

- Cable length:
  0.4 mm wire: approximately 1 km
  0.6 mm wire: approximately 1.8 km

Note: *You are recommended to use shielded cables.*

- **It is essential to adhere to the standards between weak and strong currents**.
  The distance between the telephone cable and the source of interference (mains electrical conductor, fluorescent light with starter, etc.) must be at least 30 cm (12 in).
- Do not connect two telephone sockets in parallel to the ICS.
- Digital telephones cannot be used as emergency stations, for example, on power fail failure.

The table below sets out the main characteristics of sets with display panels:

	M405	M420E	M520	M640
Mute			*	*
Redial	*	*	*	*
Individual directory (10 numbers)			*	*
Amplifier	*	*	*	*
Ring volume	4	8	8	8
Tune setting	8	8	8	8
"Hold"	*	*	*	*
Handsfree			*	*
Intercom function			*	*
menu	1x16	1x16	2x40	2x40
Function keys with LED	2*	7	8	8
Programmable keys with LEDs	5	20	20	40
Interactive keys			5	5

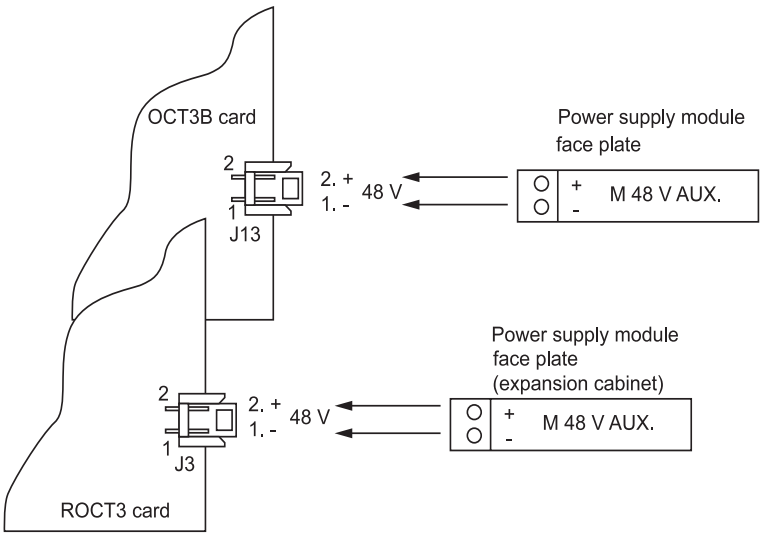
* Function key with no indicator light associated

The table below shows the main characteristics of M7xx range sets:

	M720	M730	M740/M740E	M760/M760E	M780
Mute	YES	YES	YES	YES	YES
Redial	YES	YES	YES	YES	YES
Private internal directory		20	20	100	200
Amplifier	YES	YES	YES	YES	YES
Ring volume	YES	YES	YES	YES	YES
Tune setting	8	16	16	16	16
Intercom			YES	YES	YES
Full duplex hands free			YES	YES	YES
Extension module socket (20 keys)				YES	YES
Display unit (LCD)		1x16	1x16	2x40	24x40
Interactive keys				5	5 virtual
Program keys	1 LED	4 LED	10 LCD icons (M740) LED (M740E)	20 LCD icons (M760) LED (M760E)	60 Virtual icons
On-hook dialling	YES	YES	YES	YES	YES

All digital telephones are protected against most faults such as short-circuits and connection to an analogue socket. In each case, the set remains silent.

The digital equipment on the OCT4 and ROCT3B cards are powered by the power supply module through an external cable.



Installing an external mains unit

A mains unit can be added to the M520 and M640 sets to relieve the PBX from excessive consumption (more than 10 LEDs in frequent use).

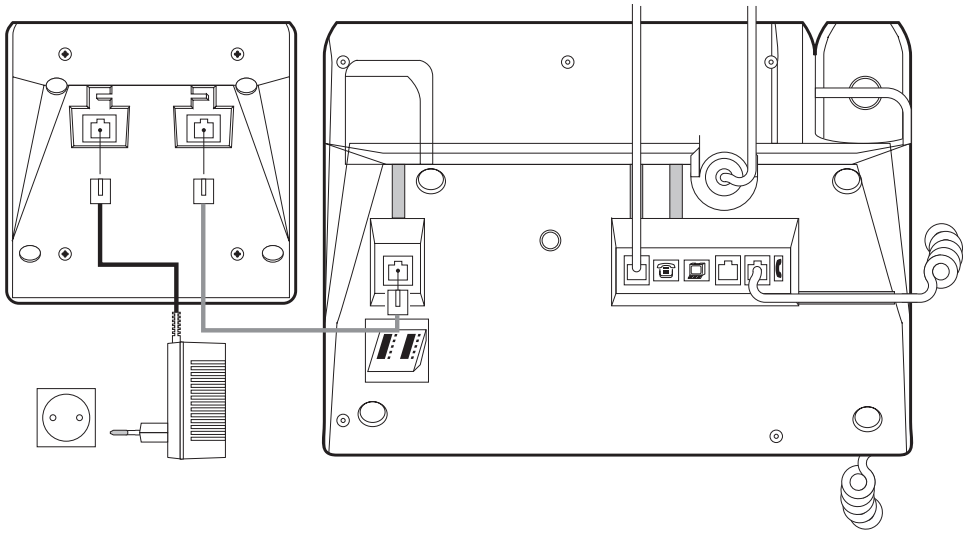
Note: *This mains unit should be supplied from a single-phase, 230 V AC network, excluding IT diagram units defined in standard NF EN 60.950.*

If the M520 or M640 sets are expanded using an M600 module, the mains unit is connected to the M600.

In all cases, the mains unit is connected via an RJ 45 (8-pin) connector.

Installing an M600 expansion module

The M600 expansion module provides an additional 20 programmable keys with associated LEDs to the M520 and M640 telephone sets. Connect the module as shown in the figure below:



Installing an IP cartridge on M760 and M780 sets

M760 and M780 sets can be converted into i760 and i780 IP sets by the addition of an IP cartridge which enables the sets to be connected to a LAN. There are IP cartridge versions: one for the M760, and one for the M780.

The procedure for installing a cartridge is given in the M7xx digital set and i7xx IP set Installation Manual- ref. PS9286BAA01.

Installing an M700 expansion module

The M700 expansion module provides M760, M780, i760 and i780 telephone sets with an additional 20 programmable keys with no backlighting. One or two M700 modules can be added to M760, M760E and i760 sets, and up to three modules to M780 and i780 sets.

The procedure for installing an M700 expansion module is given in the M7xx digital set and i7xx IP set Installation Manual- ref PS9286BAA01.

Installing an M710 expansion module

The only difference between the M710 expansion module and the M700 module is that the 20 programmable keys are monitored by LEDs instead of LCD icons. The other specifications remain unchanged.

The procedure for installing an M710 expansion module is given in the M7xx digital set and i7xx IP set Installation Manual- ref PS9286*.

Installing an M705 expansion module

The M705 module is an expansion module containing 20 additional keys, with no back lighting, in which the top part is used to hold an M90x range DECT handset charger. It can be added to M760, M760E, M780, i760 and i780 sets.

The procedure for installing an M705 expansion module is given in the M7xx digital set and i7xx IP set Installation Manual- ref PS9286BAA01.

Installing an M715 expansion module

The only difference between the M715 expansion module and the M705 module is that the 20 programmable keys are monitored by LEDs instead of LCD icons. The other specifications remain unchanged.

The procedure for installing an M715 expansion module is given in the M7xx digital set and i7xx IP set Installation Manual- ref PS9286BAA01.

Connecting a headset

Several manufacturers (GN Netcom, LEM, Plantronics) offer headsets.

Connecting a modem

Modem access for incoming calls is possible for M420E, M520, M640, M760 and M780 sets.

The connection is made to pins 2 and 4 to avoid any confusion with the line input.

A special lead (HK6637) is required for M420E, M520, and M640 sets.

An analogue options card is required for M760 and M780 sets.

Connecting an LF connector

An audio connection is available on M420E, M520, M640, M760 and M780 sets.

The stereo jack supplies one input and one output, which can be connected by an appropriate cable to a sound card on the PC.

An analogue options card is required for M760 and M780 sets.

Connecting a Minitel

Minitels can be connected to M420E, M520, M640, M760 and M780 sets.

A special lead (HK6637) is required for M420E, M520, and M640 sets.

An analogue options card is required for M760 and M780 sets.

Connecting analogue terminals

The M6501L/R IP PBX has analogue trunk lines that are designed to be compatible with various types of equipment such as telephones, group 3 fax machines, modems, answering machines, and voice mail systems.

They can be connected, via the distribution frame, to the following cards:

Cards	Connectors	Nb of lines
LA4	J2 and J3	4
LA8	J2, J3, J4, and J5	8
LM4	J2	2
LM8	J2 and J3	4

Connecting an analogue terminal

The requirements to connect an analogue terminal are:

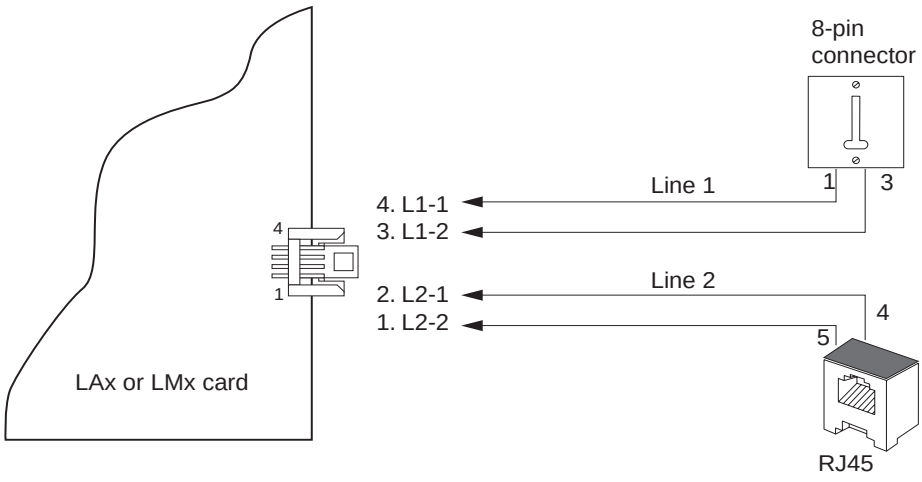
- the voltage and current measured across the station during conversation must be: U > 12.4 V and I > 25 mA
- line resistance (taking the set into account): 600 Ohms
- line length:

  0.4 mm wire:
  approximately 2 km

  0.6 mm wire:
  approximately 3.5 km

- all the analogue terminals connected to the PBX must be configured for Zref impedance and self-regulation.

The principle for wiring an analogue set is shown in the diagram below:



Connecting IP sets

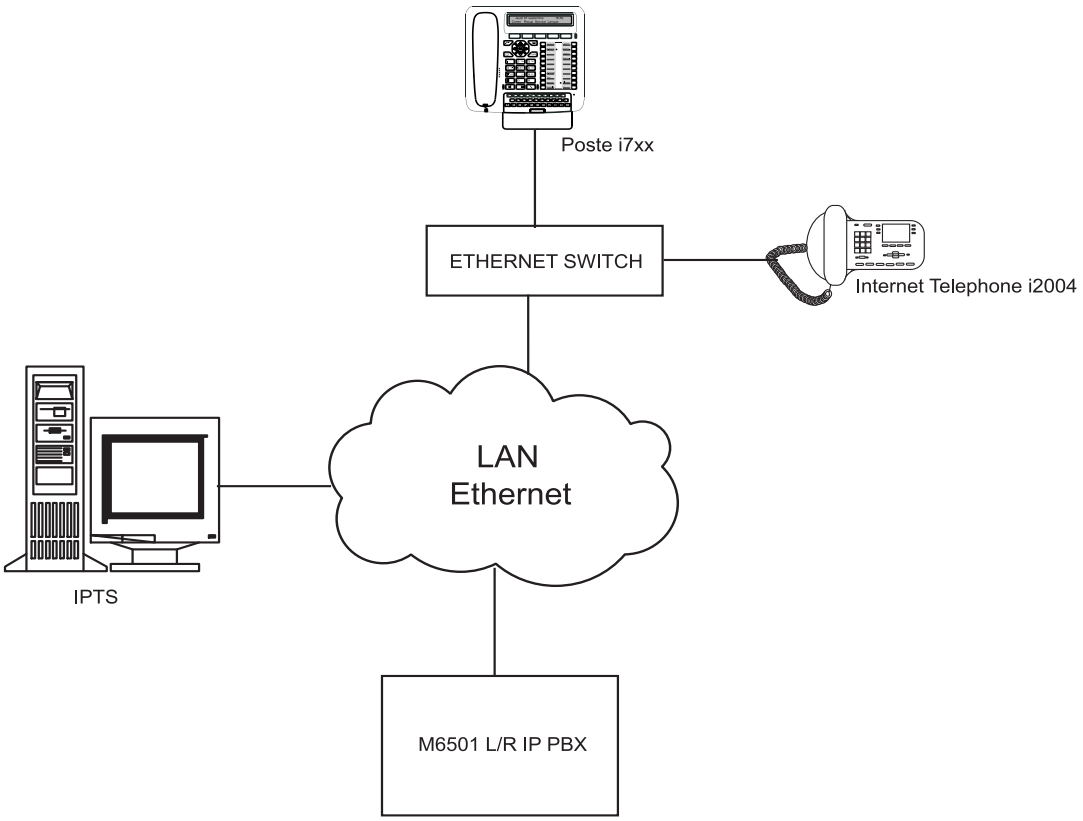
IP sets (Internet Telephone i2004, i740, i760, i780) are connected to a LAN hub or switch with a standard Ethernet cable.

The IP set must be connected to a 10/100 Base Ethernet connector.

The M6501L/R IP PBX must be fitted with a PT2 card connected to the Ethernet LAN.

In the case of anInternet Telephone i2004, a PC fitted with Terminal Proxy (application part of NeXspan Communication Server) must be connected to the Ethernet network. The procedure for putting theInternet Telephone i2004 into service is given in the document "Installation and Configuration Guide - NeXspan Communication Server".

The procedure for putting i740, i760 and i780 sets in service is given in the M6501L/R IP PBX Programming Guide.



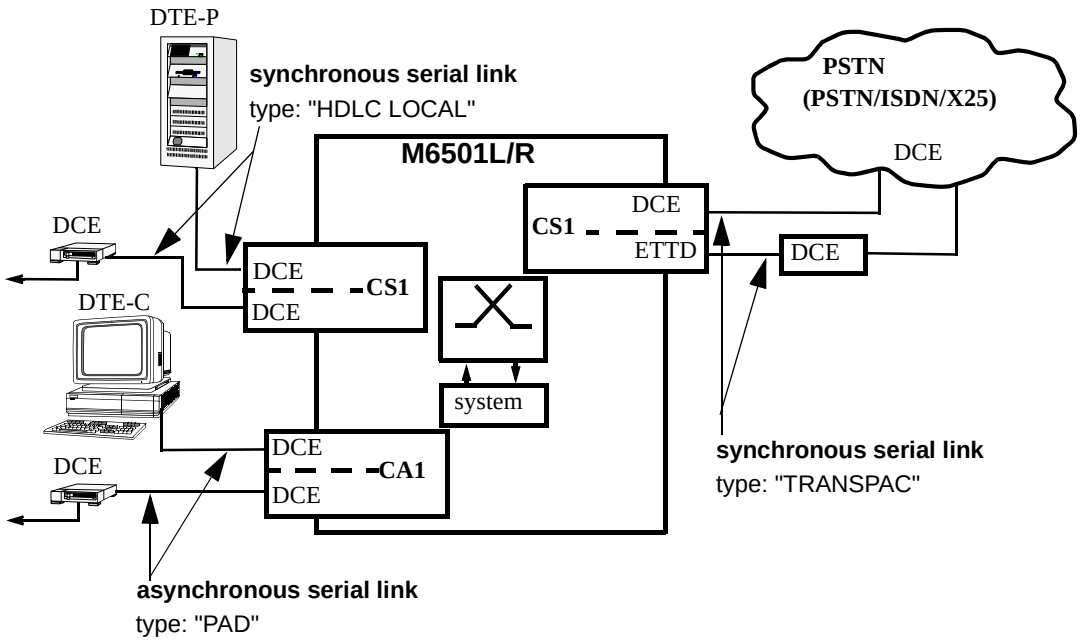
Connecting EDP terminals

The CA1 and CS1 cards are used to connect EDP terminals (DTE or DCE) in V24/V10 mode:

- The CA1 card provides four asynchronous terminal connections at a maximum speed of 19200 bit/s. XON/XOFF flow control is used.

Note: *The V24/V10 interface is compatible with V24/V28 (RS232C) equipment.*

- The CS1 card provides two synchronous SNA/SDLC connections at up 19,200 Kbit/s and SNA/X25 connections at up to 64 Kbit/s.



Wiring an asynchronous serial link

The shielded serial link cable with the reference HG2829A is used to connect asynchronous data terminals to the CA1 card in V24/V10 mode.

The following tables give a list of the circuits in the V24 junction on the CA1 card.

Connecting a DCE (CA1) to a DTE (PC or VT100 console)

Circ^{t}	Designation			ETTD		Direction CA1->DTE	Connectors J2 to J5 CA1 card
	CCITT	EIA	CA1	9-pin	25-pin		
104	RD	RD	NDE	2	3	--->	**A1** received data
103	ED	ST/TD	NDR	3	2	<---	**A2** transmitted data
108	TDP	DTR	DTR	4	20	<---	**B4** data terminal ready output
106	PAE	CTS	CTS	8	5	--->	**B3** flow control input
102	TS	GND	SGND	5	7	<---	**A5** 0 V return for junction output
							B1 not wired
							B2 not wired
105	DPE	RTS	RTS	7	4	<---	**A4** flow control output
109	DS	CD	CD	1-6	6-8	--->	**A3** data terminal input
			RET	5	7		**B5** 0 V return for V10 junction input

Note: *Circuit 107 "Data set ready" (PDP or DSR) is not present on the CA1 card. The straps are not shown in this table.*

Connecting a DTE (CA1) to a DCE (modem or V24 adapter)

Circ^{t}	Designation			DCE		Direction CA1->DCE	Connectors J2 to J5 CA1 card
	CCITT	EIA	CA1	9-pin	25-pin		
104	RD	RD	NDE	2	3	<---	**A2** received data
103	ED	ST/TD	NDR	3	2	--->	**A1** transmitted data
108	TDP	DTR	DTR	4	20	--->	**A3** data terminal ready output
106	PAE	CTS	CTS	8	5	<---	**A4** flow control input
102	TS	GND	SGND	5	7	--->	**A5** 0 V return for junction output
							B1 not wired
							B2 not wired
105	DPE	RTS	RTS	7	4	--->	**B3** flow control output
109	DS	CD	CD	1	8	<---	**B4** data terminal input
			RET	5	7		**B5** 0 V return for junction input (V10)

Note: *Circuit 107 "Data set ready" (PDP or DSR) is not present on the CA1 card. The straps are not shown in this table.*

Wiring a synchronous serial link

The shielded serial link cable with the reference HG2830A is used to wire interfaces on the CS1 card.

The following tables give a list of the circuits in the V24 junction on the CS1 card.

Connecting a DCE (CS1) to a DTE

Circ[t]	V24 signal name			ETTD ISO 2110 (25 pins)	Direction CS1->DTE	J2 / J3 CS1 card
	CCITT	EIA	CS1*			
104	RD	RD	NDE	3	<---	**A1** received data
103	ED	ST/TD	NDR	2	--->	**A2** transmitted data
108	TDP	DTR	DTR	20	<---	**B4** data terminal ready output
106	PAE	CTS	CTS	5	--->	**B3** flow control input
102	TS	GND	SGND	7	--->	**A5** 0 V return for junction output
115	HRM	CR	HR	15-17	--->	**B6** clock received for received data
113		XTC		24	--->	**A6** transmitted clock
						B2 not wired
105	DPE	RTS	RTS	4	<---	**A4** flow control output
109	DS	CD	CD	6-8	<---	**A3** data terminal input
			RET	7		**B5** 0 V return for V10 junction input
114	HEM	TC	HT	15	--->	**B1** clock received for transmitted data

Connecting a DTE (CS1) to a DCE

Circ[t]	V24 signal name			DCE ISO 2110 (25 pins)	Direction CS1-->DCTE	J2 / J3 CS1 card
	CCITT	EIA	CS1			
104	RD	RD	NDE	3	<---	**A2** received data
103	ED	ST/TD	NDR	2	--->	**A1** transmitted data
108	TDP	DTR	DTR	20	--->	**A3** data terminal ready output
106	PAE	CTS	CTS	5	<---	**A4** flow control input
102	TS	GND	SGND	7	--->	**A5** 0 V return for junction outputs
115	HRM	CR	HR	17	<----	**A6**clock received for received data
113		XTC		24	--->	**B1** transmitted clock
						B2 not wired
105	DPE	RTS	RTS	4	--->	**B3**flow control output
109	DS	CD	CD	8	<---	**B4** data terminal input
			RET	7	--->	**B5** 0V return for junction input (V10)
114	HEM	TC	HT	15	<----	**B6** clock received for transmitted data

Connecting miscellaneous equipment

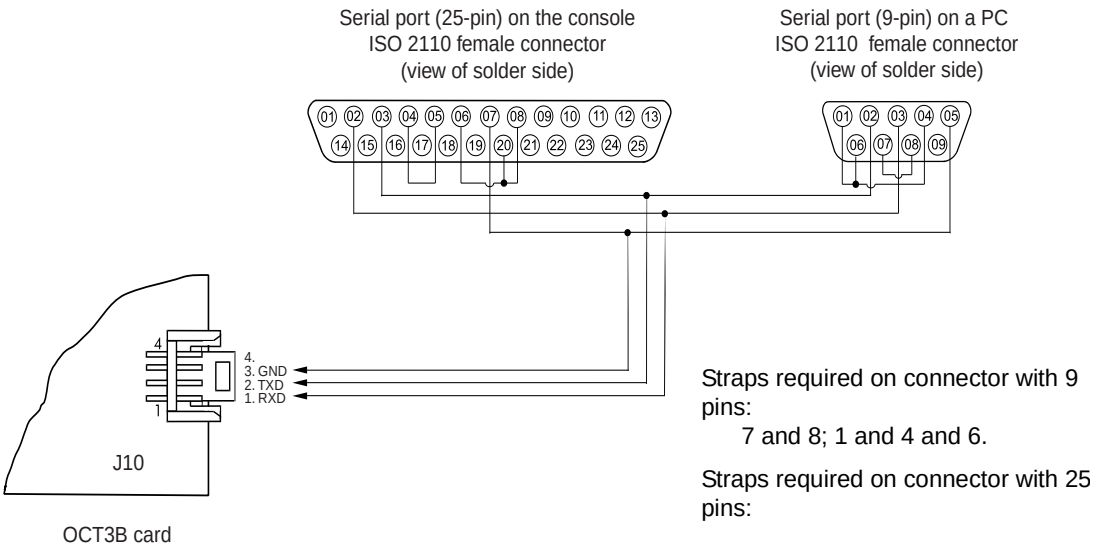
Connecting the programming console

The programming console is used to interface with the M6501L/R IP PBX for programming, displaying, and printing site configuration data (when a printer is connected to the programming console).

It can be a VT100 console or a PC (with VT100 emulation).

The programming console can be connected to the system either directly or remotely. Direct connections, which must be no longer than 15 m (50ft), run via the distribution frame and end at the COM port connector assigned to the console on the OCT4 card; remote connections use an internal modem on the OCT4 card or an external modem.

Note: *You are advised to use a PC, because the configuration can only be backed up on a PC.*


Serial port (25-pin) on the console
ISO 2110 female connector
(view of solder side)
Serial port (9-pin) on a PC
ISO 2110 female connector
(view of solder side)
01 02 03 04 05 06 07 08 09 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25
01 02 03 04 05
06 07 08 09
4
1
4.
3. GND
2. TXD
1. RXD
J10
OCT3B card

Straps required on connector with 9 pins:

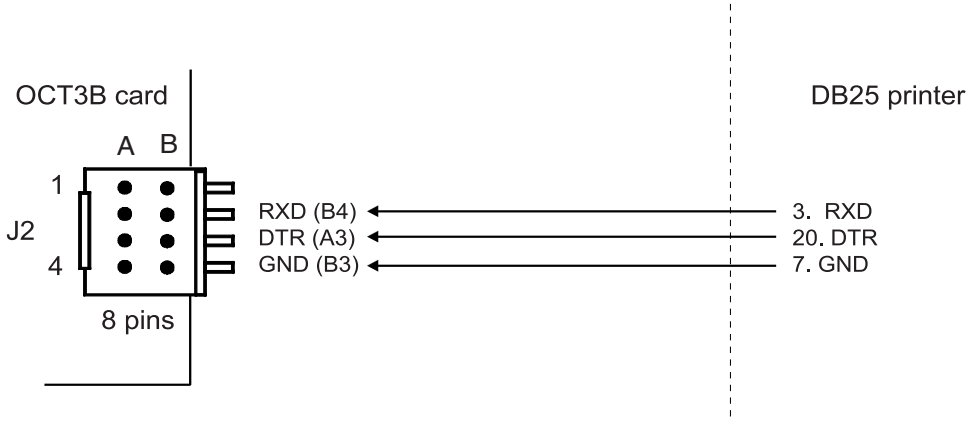
7 and 8; 1 and 4 and 6.

Straps required on connector with 25 pins:

Connecting a erial printer

The serial printer is used to print out records as the system issues them.

The service printer is connected via the distribution frame to the pins on the J2 connector of the OCT4 card using a two-pair cable:



Note: *The TXD printer connection is not necessary for the printer to operate properly.*

Configure the serial printer (RS232C) as follows:

Data rate:	9600 bit/s
Data bits:	8 bits
Parity:	nil parity
Stop bit:	1 stop bit
Respect the distance defined in Standard RS 232C (approximately 15 m, or 50 ft)	

Connecting an external music source

The music used while a call is put on hold and as background music can be supplied by any digital music on-hold device with a high-impedance audio output.

CAUTION

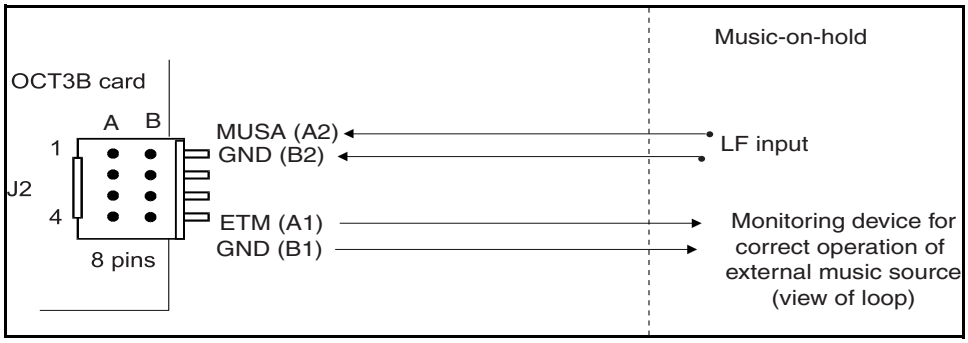
If an external music source is used, SACEM (performing rights organisation) royalties must be paid.

The recommended input level for the M6501L/R IP PBX system is 35 mV rms across an input impedance of 15 kOhms.

If an external music device is connected to the M6501L/R IP PBX, the 12 V signal must be looped back on the ETM pin, so that it will be detected by the software. The external music then overrides any internal source.

To install an external music source:

1 Connect the music source output via the distribution frame to the J2 connector on the OCT4 card as shown in the figure below.



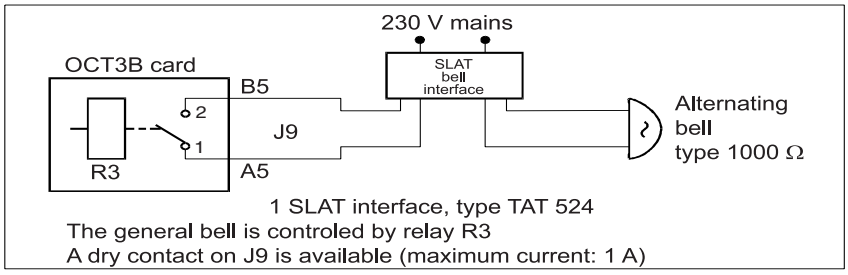
2 The music volume can be adjusted via an MMC.

You can use programming menu 5.1 (Tone definition) to replace the network hold tone by the external music-on-hold, once you have installed the external music source and put the system into service.

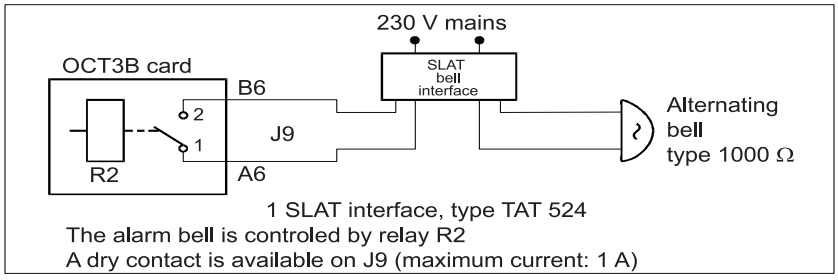
Connecting a common bell

The M6501L/R IP PBX provides a restricted night service relay (R3) enabling the connection of a telephone set or any type of ringing device. This device switches relay R3 on the OCT4 card in the event of an incoming call which is answered or unanswered, depending on the required type of operation (call handling programming).

Common bell setup requires no programming. It is implemented when you power on the system. It has its own directory number: 78 or 798.



Connecting an alarm bell



Wiring DECT base stations

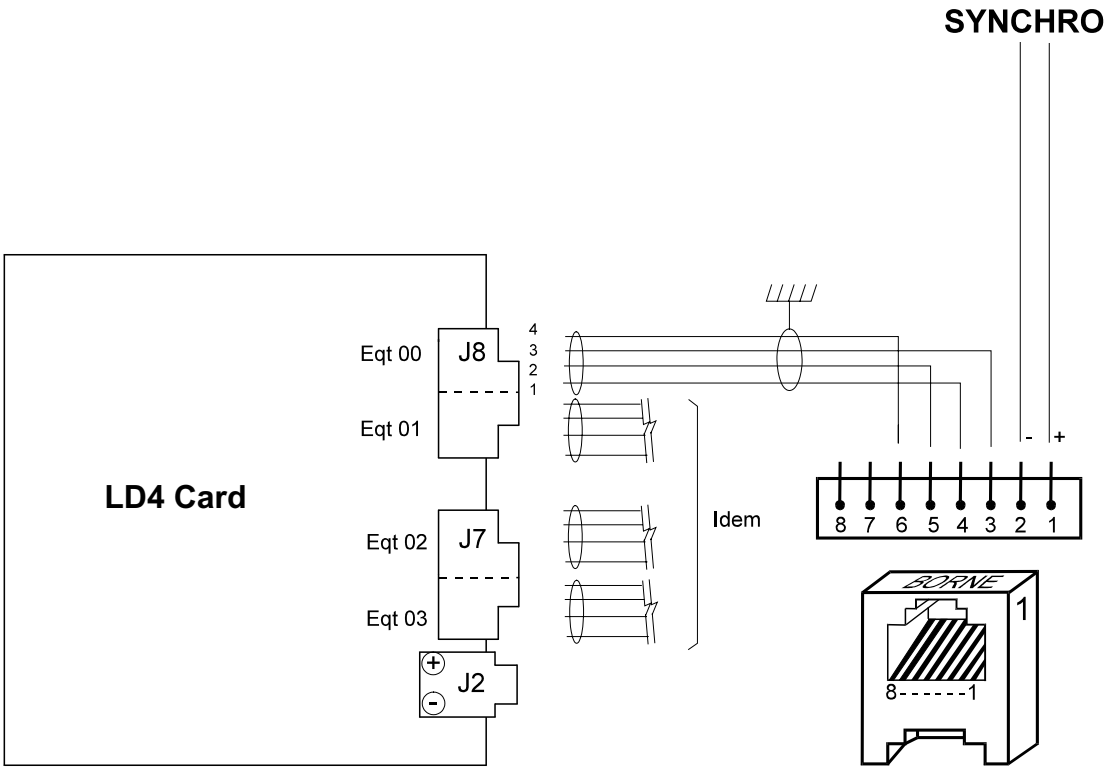
CAUTION

Never invert the polarities of the clock and transmit/receive pairs.

Each terminal is connected to the ISDN S0 (BRI) of an LD4/LD4N card, and uses two pairs: 1 transmit pair and 1 receive pair.

☆ *Refer to the "Integrated DECT service" installation manual for more information.*

Note: *if there are a DECT base station and an S0 terminal (other than the base station) on the same card, the base station must be powered with a 40 V supply.*

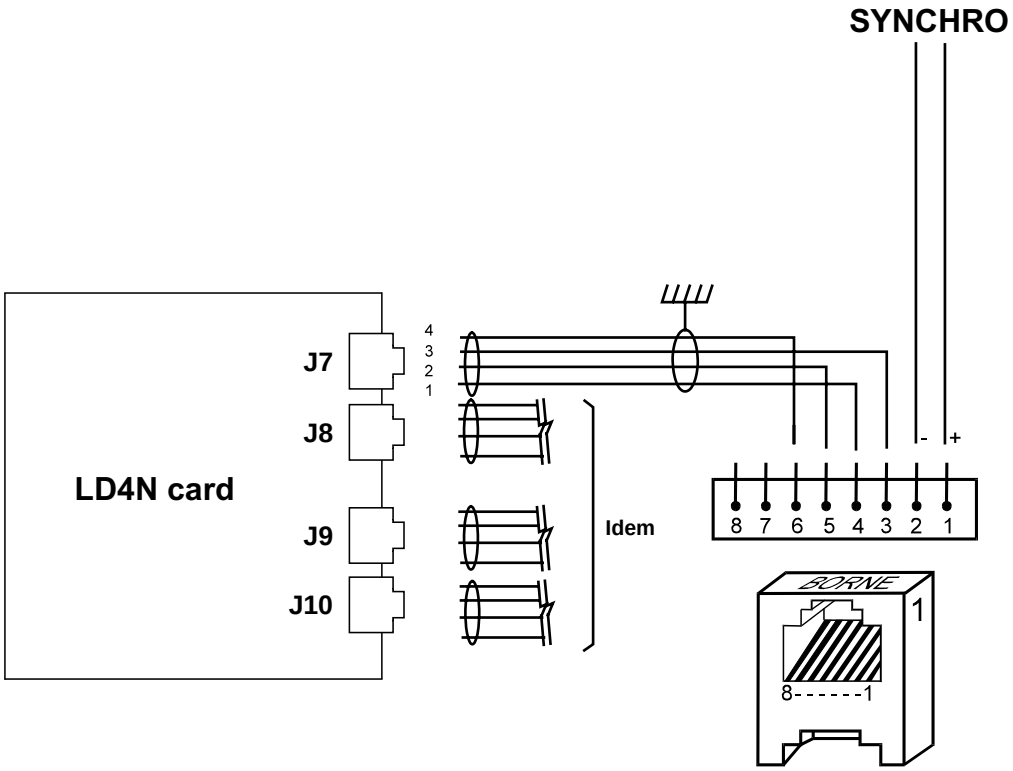


Connecting DECT base stations to an LD4 card (synchronisation signal by third pair)

Whatever the synchronisation mode, ground the shielding or unused pairs to the cabinet.

S0 interface link with DECT base station:

8-pin STOCKO connector	RJ45 connector
Pin 4 (NRD1)	Pin 6
Pin 3 (RD1)	Pin 3
Pin 2 (NED1)	Pin 5
Pin 1 (ED1)	Pin 4



Connecting DECT base stations to an LD4N card (synchronisation signal by third pair)

S0 interface link (LD4N car) with DECT base station:

4-pin STOCKO connector	RJ45 connector
Pin 4 (NRD0)	Pin 6
Pin 3 (RD0)	Pin 3
Pin 2 (NED0)	Pin 5
Pin 1 (ED0)	Pin 4

Steps prior to power on

Grounding the ICS

The system must be correctly grounded in order to ensure user safety and protect against lightning and voltage drops, and also to prevent service interruptions.

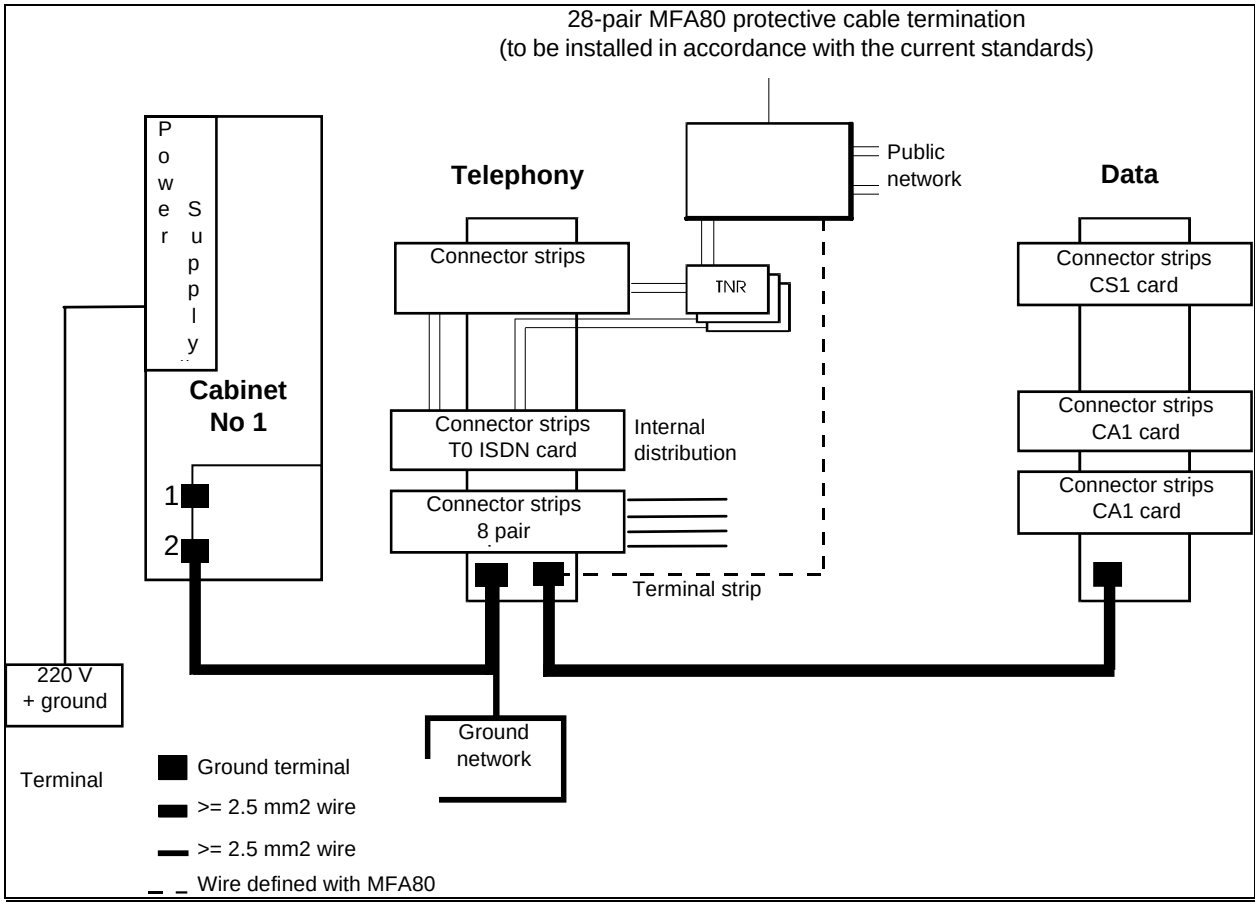
To ground the M6501L/R IP PBX:

- connect one end of the power cord to the power supply module and the other end to a grounded mains outlet.

Power to the ICS must be switched off when you fit the power cord

Always isolate trunk lines before unplugging the mains power cord.
Never connect trunk lines while the mains power cord is unplugged.

- combine and connect the ground braid (shield) of all the distribution cables to the ground terminal in the installation's main distribution frame.



Fitting the cabinet cover

Fire and electric shock

Before replacing the cabinet cover, check that you have not left any metal objects such as tools, screws, or clips inside.

When all the cards have been installed and wired to the distribution frame, replace the cabinet cover(s).

Installing backup batteries

- The M6501L IP PBX must be backed up by an external **48 V battery** supplied by the customer.
- The M6501R IP PBX is supplied with an **internal battery** installed in the cabinet.

When installing or removing batteries, the installer should always carefully follow the steps described below.

Fitting an external battery

1. Connect the battery cable on the battery side.
2. Fit the battery in the required location in the battery module.
3. Connect the battery cable to the connector provided. This connector is located on the side of the power supply module.

Note: *Check the **+** and **-** polarities.*

Removing an external battery

1. Put the battery out of service:
   press the red switch on the battery on/off circuit breaker on the left side of the power supply module.
2. Remove the battery cable from the power supply module.
3. Remove the battery from its module.

Note: *The battery manufacturer's recommended preventive maintenance must be performed at regular intervals and the results recorded in the Programming record.*

Connecting the internal battery

- Connect the battery cable to the connector provided. This connector is located on the left side of the power supply module, outside the cabinet.

Removing the internal battery

1. Put the battery out of service:
   press the red switch on the battery on/off circuit breaker on the left side of the power supply module.
2. Disconnect the battery cable from the backed-up power supply module's connector.
3. Remove the cabinet cover.
4. Remove the battery and its mount from the cabinet.

Note: *The preventive maintenance operations described in the battery manufacturer's installation manual must be performed at regular intervals and the results recorded in the Programming record.*

When you have installed the hardware, you can turn on the system. This triggers initial start-up, at which point the system software is loaded, the start-up tests are run, the application program is loaded and the default configuration is initialised. At the end of this phase, the splash screen appears on the programming console. The first time the hardware is installed, you must reset the system before you start programming.

After a total reset, a resident program automatically configures the system using the default parameters. In the process, the installed cards are activated and recognised.

To set up a new system:

- configure the programming console
- power on the PBX
- perform a total reset
- check the pre-configuration.

Note: *Before resetting the system, power up and configure the programming console.*

Programming console configuration

To configure the console to link with the system, you need an asynchronous communication package to emulate the VT 100 console. Many software packages are available. The instructions given here are for the Windows 95 application Hyperterminal.

1. Go to Accessories > HyperTerminal.
   The HyperTerminal icon appears.
2. Open the HyperTerminal application.
3. Enter a name for the connection, and select an icon. Click OK.
4. On the line Connection, select COM 1 or COM 2, depending on the communication port used. Set the transmission parameters as follows:

Transmission speed	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	Xon/Xoff

5. Click on OK.

Power on the system

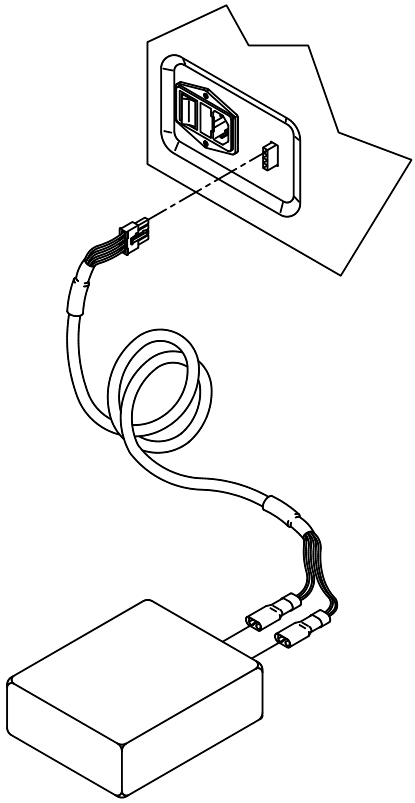
Risk of fire and electrical shock

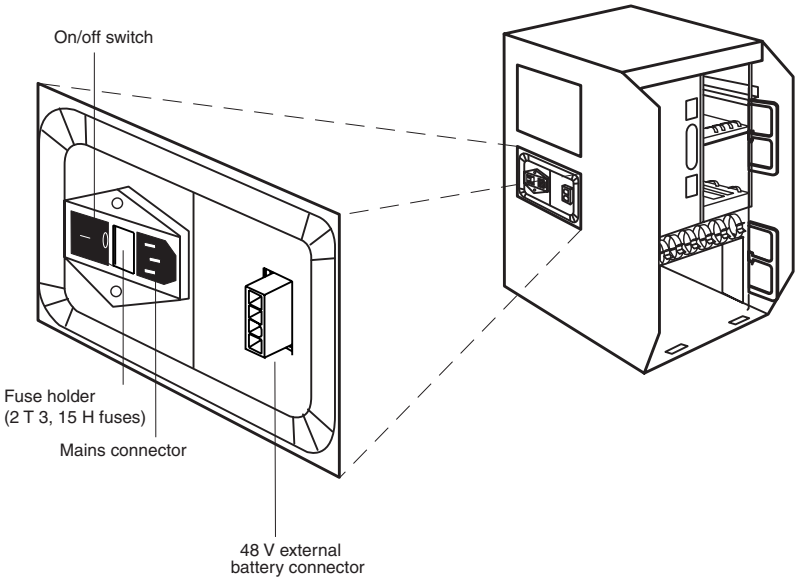
To protect against risk of fire and electrical shock:

- make sure there are no screws, tools, or any metallic items inside the racks
- make sure the system is connected to a socket with an earthing conductor
- never open the cover before you have turned off the system

Before switching on the power, check that:

- air flows freely all around the cabinet(s) and there are no objects lying on the cabinet, there must be sufficient clearance between the cabinet and the wall
- all the expansion cards are connected
- the PT2 card is connected to the Ethernet LAN
- all devices are connected to the PBX and earthed
- the external 48 V battery is connected to the ADS300 power supply module, as shown in the diagram below:





To power up the M6501R IP PBX:

1. Press the black button to the left of the power supply module.
   Yellow and green LEDs light up on the front panel of the power supply module.

To power up the M6501L IP PBX:

1. Power up the expansion cabinet (if one is fitted).
   Press the black button to the left of the power supply module.
   Yellow and green LEDs light up on the front panel of the power supply module.
2. Power on the main cabinet.
   Press the black button to the left of the power supply module.
   Yellow and green LEDs light up on the front panel of the power supply module.

The system begins its test sequence, displaying the results on the programming console. Wait for the main menu to appear on the screen before performing a total reset.

Performing a total reset

A total reset clears all data from existing programming.
A total reset erases any existing programmed data, and the system configures itself automatically to the installed equipment.
A total reset should only be performed when instructed, for example if installing new software.

You must perform a "total" reset the first time the equipment is put in service.

Comments:

- To perform a "total" reset, you need the "installer" password.
- As soon as the initialisation tests begin, type "CO" **immediately** to switch the system to manual control.

To perform a "total" reset of the M6501L/R IP PBX:

1. Go to menu 5.1.3 (Restart request). The screen `RESTART REQUEST` appears.
2. On the line `RESTART TYPE`, select `STANDARD` (using the space bar on the PC). Press Enter.
3. On the line `CONFIRMATION`, select `YES`. Press Enter.
4. As soon as the screen begins to display the start up tests, type "CO" to change over to manual control.
5. Several tests are displayed. Then the line `RESET PASSWORD` appears. Type in the default password `TOTAL`. Press Enter.

Note: *If no password is requested, repeat the reset operation.*

Wait for the device to run the test series, recognise the installed cards and configure itself automatically.

This will take a few minutes. When the main menu appears on screen, the initial start-up will have been completed successfully.

The system performs an additional reset
If the capacity of the line cards installed exceeds 60 terminals, the system automatically extends the internal directory number length from two to three digits, then restarts in order to incorporate the change.

During system restarts, you must wait until the main menu is displayed.

No user intervention is required when the system restarts.

System resetting was successful and the system runs normally when the telephones display:

Monday 01 January 12:00 am.

Your system is now in service with default settings.

Make an internal call to confirm telephone operation. If you are using ISDN T0 (BRI) trunks, make an external call, for example to the speaking clock, to confirm outgoing calls.

If PT2, PSTN or ISDN/T2 (PRI) cards are used, some additional programming steps are required to put the lines into service and route outgoing calls.

If any of these tests are not conclusive, for example if there is no display on the telephones or if you are unable to make an external call on ISDN/T0, perform another total reset.

Displaying the software release number

The system version shows the release number:

- of the system processor software resident on the CPU card
- of the application software resident on the CPU card
- of the type, capacity, and software version of the PTx gateway card

If you need to call the Technical Assistance Support (TAS), you will be asked to provide your release and some general information about your system.

To display the software version:

1. Go to menu 5.4.1 (Software identification). The screen `SOFTWARE IDENTIFICATION` appears.
2. The display shows several lines. Make suer the information entered in the lines `SYSTEM PROM.` (software release of installed system), and `APPLIC PROM.`(loaded software application) and on the PT2 card are the same as those recorded in the *Programming Record.*

Contact your distributor if these details do not coincide.

Viewing the system ID

The system identification number, or ID, is given on a label on the left panel of the main cabinet and on the OCT4 main card. It is also stored in the removable i-Button software dongle.

Record the system identification code in the *Programming Record*. It will be useful if you need to restore an upgraded system after a system restart.

The system ID can be viewed at any time during a programming session by following these steps:

1. Go to menu 3.8.1 (Unlock SA functions). The screen `SELECTION OF THE SA FUNCTION` appears.
2. Press Enter. The screen `UNLOCK< FUNCTION NAME>` appears.

The line `ID NUMBER` displays the system ID number. Record this code in the *Programming Record*.

Note: *Before you program the site data, read the information below and copy it to the Programming Record.*

Display external trunk status

Description

For viewing the status of equipped external lines to make sure they are available.

You can view the status by selecting a specific status and/or trunk group and/or from an equipment number.

Menu	Comments
4.6.2 STATUS OF EXTERNAL TRUNKS	The display shows: STATUS SEARCHED: allows viewing based on one of the following statuses: Any, Free, Busy, Perm. off-hook cond., Free incoming, Out of srv, Locking, Alarm, Free locking, Free call back, On service waiting. If no status is specified, all lines are displayed regardless of their status. ON THE TRUNK GROUP: Used for viewing based on a specific trunk group. If no trunk group name is specified, all the lines are displayed regardless of their trunk group.
DISPLAY STATUS OF EXTERNAL TRUNKS	The outcome of the viewing session is shown in a table indicating: EQT ACCES: (card, equipment, access number, trunk group and call distribution service). The access number will be used to program digital telephone keys for supervising external lines. TR GP: trunk group name associated with line. STATUS: line status. IT PH: IT PH associated with the line.
FIRST PHYSICAL EQUIPMENT	Define a search from an equipment number. The external trunk lines on the trunk group are displayed starting with the first position indicated.

Programming steps

1. Go to menu 4.6.2. (External line status); the screen `SELECTION OF A STATUS TO MONITOR` appears.
2. On the line `STATUS SEARCHED,` you can select a status.
3. On the line `ON TRUNK GROUP,` you can select a trunk group.
4. On the line `FIRST PHYSICAL EQUIPMENT`, select an equipment number (if applicable). The external trunk lines on the trunk group are displayed starting with the first position indicated.
5. Press Enter. The display screen appears:

Menu	Comments
`EQT ACCESS`	the card, equipment, access number, trunk group, and call distribution service (if the COMPANY/DEPARTMENT (multi-company) function is validated); the access number is used for programming the keys on digital telephones to monitor external lines
`TK GR`	the name of the trunk group linked with the line
`STATUS`	line status:
`IT.PH`	indicates the physical interval, or time slot (TS) associated with the line

Displaying extension numbers and locations

Description

For viewing pre-set extension numbers.

Menu	Comments
1.1.6.1 DISPLAY BY EQUIPMENT NUMBER	To access this screen, enter an equipment number on the line FIRST EQUIPMENT NUMBER. This option shows: EQT NO.: telephone equipment number TYPE: type of telephone connected DN: directory number DID: direct inward dialling number for the extension NAME: user name
1.1.6.2 DISPLAY BY INTERNAL DIRECTORY NUMBER	This option shows: DN: directory number EQT NO.: telephone equipment number DID direct inward dialling number for the extension NAME: user name TYPE: type of telephone connected To access this screen, enter your extension number on line FIRST DIRECTORY NUMBER. enter an extension number.
1.1.6.3 DISPLAY BY DID DIRECTORY NUMBER	To access this screen, enter a directory number on the line FIRST DIRECTORY NUMBER. This option shows: DID: direct inward dialling number for the extension DIR: directory number EQT NO.: telephone equipment number in the ICS TYPE: type of DID number PLAN(S): DID plan number (no PLAN is specified in the default configuration)
1.1.6.4 DISPLAY BY NAME	To access this screen, enter first letters of telephone to be consulted on line A START BY NAME BEGINNING WITH. The names of other extensions will be listed in alphabetical order after it This option shows: NAME: user name DN: directory number. DID: direct inward dialling number for the extension
1.1.6.5 DISPLAY DIGITAL SETS ONLY	This option shows: DN: directory number EQT NO.: telephone equipment number in the ICS MODEL: set model, including OP for operator consoles **C** is for the cartridge number **M** for Minitel modem interface **R** is for answering machine **L** is for smart card **N** for handsfree
- Folio 1 de 2 -	

Menu	Comments
1.1.6.6 DISPLAY INTERCOM GROUPS	To access this screen, on the line GROUP SELECTION, enter the number of the intercom group to be displayed and press Enter. The system displays a list of all the directory numbers that belong to the group. This option shows: DN: the extension directory number NAME: the extension user name COMPANY: name of the user home company (for multi-company configuration) DEPT: name of the company department (for multicompany configuration).
1.1.6.7 DISPLAY FEATURES	This option shows, among other details: BELONGS TO HUNT GROUP X: number of the group to which the extension belongs BELONGS TO ANNOUNCEMENT X: number of the announcement list to which the extension belongs
1.1.6.8 OTHER DISPLAY	1.1.6.8.1 DISPLAY SUBSTITUTE SETS This option shows: SUBSTITUTE: substitute set number and start of name of substitute set SUBSTITUTED: substituted extension site and substituted set directory number 1.1.6.8.2 LOCATION OF SUBSTITUTED SETS This option shows: SUBSCRIPTION: substituted set number and start of name of substituted set SUBSTITUTED BY: substitute extension site and substitute set directory number 1.1.6.8.3 DISPLAY EMERGENCY CALLBACK SETS **Note:** *This menu is only for USA configuration USA.* This option shows: DN: Shows the directory numbers (in ascending order) of the sets declared as emergency callback sets. NAME: Shows the names of the users. IP SUBNET: Shows the first IP subnet using this set. If the information declared is consistent between the subscriber sites and the site where the CAC server is located, the "IP subnet" field should be up-to-date.
- Folio 2 de 2 -	

Programming steps

1 Go to menu 1.1.6 (Extension Directory). The screen EXTENSION DIRECTORY appears.

2 Enter the menu number that you need (as shown in the table above). Press **ENTER**. The screen of your selection appears.

View extension status

Description

The system displays the status of telephone sets after a "total" reinitialisation on the basis of two criteria: the set status (see the list of statuses in the table below) and/or a directory number..

Status	Comments
ANY	list of all phones in all statuses
FREE	list of all phones in service and free
PERMNT.	list of all sets with a call set up
BUSY.UNSTABLE	list of all phones dialling
PERM. OFF-HOOK COND	list of all analogue sets off-hook and/or digital sets not connected
OUT OF SERVICE	list of all sets taken out of service using an MMC
DISCONNECTED	ist of all non-localised sets or subscriptions

Programming step

1 Go to menu 4.6.1 (Status of extensions). The screen SELECTION OF A STATUS TO MONITOR appears.

2 Select a status (see table above) on line SEARCHED STATUS. Press Enter. The display screen appears.

☆ *Select ANY to view all the extensions*

3 On the DIRECTORY BEGINNING WITH line, enter a digit (or number). All sets with directory numbers that start with this digit (or number) are displayed.

4 When you have selected the search criteria, press Enter to confirm. The following information is displayed for each set: directory number, set equipment number in the PBX, set type and status.

View IP subscriber status

Description

The system displays all IP sets declared on the site on the basis of several criteria (set type, status of set's application session, directory number

Type of set	Comments
IP DS	IP circuit: digital set with IP cartridge (i760, i780) and i740 (IP native set)
TD PC	IP circuit: Software phone application on PC
ETHERSET	IP circuit: Internet telephone

Programming steps

1 Go to menu 4.6.1.2 (IP subscribers status). The screen APPLICATION STATUS SELECTION appears.

2 On the line TYPE OF SET select the IP set type you want. Only those IP sets of the type selected declared on the site will be displayed.

☆ *To display all the IP sets (IP DS, TD PC and ETHERSET) declared on the site, select "……..".*

3 On the line APPLICATIVE SESSION, select the set's application session status. Sets whose application session status is the same as the status selected will be displayed.

☆ *To display all sessions, select "……..".*

4 On the DIRECTORY BEGINNING WITH line, enter a digit (or number). All IP sets declared on the site with directory numbers that start with this digit (or number) will be displayed.

5 When you have selected the search criteria, press Enter to confirm. The following information is displayed for each IP set: directory number, set model, session status, CAC centre, CAC class number, site number, cluster, processor number of CLX card, IP address, UDP port number and location number (number of emergency callback set, only displayed for a USA configuration).

Chapter 2 - Expanding the installation

System backup

Save the customer's configuration before and after expanding the installation.

You can increase the installation's capacities by adding equipment to the M6501L/R IP PBX. The following components can be added to an existing configuration:

- extra cards
- an expansion shelf
- a second cabinet
- links and terminals

The configuration data needs to be changed if the system is expanded. Before adding new components, always back up the site configuration.

As in the other parts of the manual, the instructions concerning the addition of new components to the ICS are set out as a series of tasks. This simplifies the installation and programming of new devices and circuits. For more details:

- refer to *Part 1* of this manual for installation and wiring instructions
- refer to *Appendix A* of this manual for a detailed description of the various cards, connectors and configurable items

Immediately after installing and programming any new components, you should make a second backup, to save the system's new configuration.

Update the *Programming Record* with details of the new equipment and the new configuration.

The hardware capacity of the ICS in an existing system can be increased in several ways:

- with optional cards
- with an expansion shelf providing up to eight card slots
- with an expansion cabinet, providing up to six card slots
- with a shelf and expansion cabinet, offering a maximum combined capacity of 28 card slots.

Configuration equipment	Basic configuration		Expansion type		
	M6501R IP PBX	M6501L IP PBX	Main cabinet with expansion shelf	Main cabinet with expansion cabinet	Main cabinet with expansion cabinet and shelf
MAIN CABINET	YES	YES	YES	YES	YES
- OCT4 card	YES	YES	N/A	N/A	YES
- ROCT3B card	N/A	N/A	YES	N/A	YES
- TMOCT4 card	N/A	N/A	N/A	N/A	N/A
- AC/DC supply	specific M6501R IP PBX	specific M6501L IP PBX	specific M6501L IP PBX	specific M6501L IP PBX	specific M6501L IP PBX
- shelf 0	YES	YES	YES	YES	YES
- shelf 1	N/A	N/A	YES	YES	YES
EXPANSION CABINET	N/A	N/A	N/A	YES	YES
- ROCT3B card	N/A	N/A	YES	YES	YES
- AC/DC supply	N/A	N/A	specific M6501L IP PBX	specific M6501L IP PBX	specific M6501L IP PBX
- shelf 2	N/A	N/A	N/A	YES	YES
- shelf 3	N/A	N/A	N/A	N/A	YES
BUS EXTENSION CABLE	N/A	N/A	N/A	YES	YES
BATTERY	internal	external	external	external	external
Card slots	8		16	22	28
Optional cards	according to customer configuration	according to customer configuration	according to customer configuration	according to customer configuration	according to customer configuration

Activating the ADS300 power supply module and OCT4 CPU card

The M6501 L/R IP PBX installed in release R2.1 includes a new item:

- a new OCT4 CPU card, which replaces the OCT3B card.

The following two procedures describe how to install and put in service the ADS300 and OCT4.

Note: *Part 1 of this manual contains full CPU card installation and cabling details. Appendix A sets out the characteristics of the ADS300 and OCT4.*

Installing and putting in service the ADS300 power supply module

The ADS300 power supply module replaces the ADS200 power supply module. The CC1, LD4, LD4N, LT2, and MDV cards can be used with the ADS300 power supply, provided the main back plane has the reference HJ 2523DB01 or above. This procedure describes the steps to perform to replace the ADS200 power supply module with the ADS300 power supply module.

1. Power off the system. Press the black button to the left of the power supply module (Stop).
2. Power off the expansion cabinet (if one is fitted).
3. Remove the battery cable from the power supply module.
4. Remove the battery from its module.
5. Disconnect the CPU card from the front connector on the power supply module.
6. Unscrew and remove the existing power supply module (ADS200).
7. Load the backplane in the cabinet.
8. Unscrew, replace, and refix the backplane (HJ2523E).
9. Install the new module (ADS300) and fasten it in place using the appropriate screws.
10. Connect the special-purpose power cord between the ADS300 power supply and the battery.
11. Reconnect the CPU card to the new power supply module.
12. Visually inspect the various parts.
13. Replace the system's front cover.
14. Plug in the mains power cord.
15. Power on the system in accordance with the procedure described in Part 1.

Note: *If a battery is fitted, check that all the green, yellow, and red LEDs on the front panel of the power supply module are lit.*

Installing and putting in service the OCT4 card

The purpose of this operation is to replace the standard OCT3B card with the standard OCT4 card. The OCT4 card is managed in release R2.1 (V14.2) and later.

Power off

Ensure that power to the system is switched off at all times while the cabinet cover is open.

Steps

1. Before changing the cards, save the customer's data configuration.
2. Power off the M6501L/R IP PBX.
3. Remove the cover on the main cabinet.
4. Unplug the connectors leading from the standard OCTB card.
5. Gently remove the OCT3B card from its slot. Disconnect the VOCT3 daughter card from the OCT3B card, collecting the card's retaining screws and spacers.
6. Be sure to place the OCT3B in an anti-static envelope.
7. Fit the VOCT3 daughter card on the OCT4 card, using the spacers on the OCT3B card.
8. Insert the OCT4 card in the CPU slot in shelf 0. Slide the card along the card guides until it clicks into place.
9. Reconnect the connectors to the OCT4 card.
10. Perform a visual inspection to check that the various items are all in position.
11. Replace the front cover on the cabinet.
12. Plug in the external battery and mains power cords.
13. Power on the M6501L/R IP PBX in accordance with the procedure described in Part 1.
14. If a battery is fitted, check that all the green, yellow, and red LEDs on the front panel of the power supply module are lit.

The system initialisation test will begin, following the procedure described in Part 1.

The startup screen then displays the "PBX management" main menu. The card swap is now complete.

Restore the customer's data by performing the relevant procedure.

Unlock the various functions by performing the relevant procedure.

Adding a card

The M6501L/R IP PBX can be fitted with one or more expansion cards to extend the system capacity.

All types of card (called optional cards) can be installed in the ICS, depending on the existing configuration:

- analogue network cards
- digital network cards
- ISDN T2 (PRI) and/or T0 (BRI) network cards
- application cards
- equipment cards

Note: *Part 1 of this manual contains full card installation and cabling details.*

Installing and putting a card into service

Considerations

- Check that the card(s) to be inserted is/are compatible with the slot, whether in the main cabinet (shelves 0 and 1) or in the expansion cabinet (shelves 2 and 3). To do this, refer to the four optional card location tables in Appendix A *"Card locations"*.
- ISDN/T2 (PRI) cards can only occupy slots 4 and 5 in shelf 0. You may need to change the position of other cards in order to install an ISDN/T2 (PRI) card in an existing system.
- If you fit an LT2 or a 32IT CC1 (written CCI-32 in the table) in slot 0 in shelf 0, you cannot install in this shelf an LA8, LM8, LN8, LD4 and LD4N (written LD4-4 in the table) double-density card as the 4-channel base station interface (with 1 or 2 ADPCM4V cards fitted).
- LD4/LD4N cards (written LD4-4 in the table) used as 4-channel DECT base station interfaces use the time slots of the adjacent card, thereby preventing cards from being fitted in the next odd-numbered slot, with the exception of CA1, CS1, and BTX cards.
- If you fit an LD4/LD4N in slot 4, you can install a card requiring a 2Mb/s PCM junction (for example LT2) in slot 5.
- In *Appendix A* of this manual, consult the configuration option details before installing the card in the ICS.

To add a card:

1. Power off the M6501L/R IP PBX. For a twin cabinet system, first power off the main cabinet, then the expansion cabinet.
2. Remove the front cover of the cabinet in which the card is to be installed.
3. Insert the new card in the bay. Slide the card along the card guides until it clicks into place.

Note: *Configure the card before installing it. Refer to the description of the card in Appendix A.*

4. Connect the card to the distribution frame.
5. Close the front cover of the cabinet.

6 Connect the line or extension to the distribution frame.

7 Power on the M6501L/R IP PBX.

8 **Put the card in service :**

Go to menu 3.2 (Card management). On the line corresponding to the card slot, select the appropriate parameter.

9 On the line `STATUS`, select `IN SERVICE`. Press Enter to confirm. Wait a few seconds.

If the card state changes to `FAULTY`, check:

- that the card is inserted correctly
- that the selected slot is suitable
- that the card type selected matches the card properties

10 **Program the card.**

With a subscriber card, assign a directory number to each extension and put all the extensions into service (menu 1.1.1- Extension characteristics).

Description of the ICS equipment

The table below describes the cards declared in menu 3.2 (card management).

Parameter name	Card	Device on card
4 DIG. ANAL.	LA4	4 analogue terminals
4 DIG. EXT.	LN4	4 digital terminals
8 DIG. ANAL.	LA8	8 analogue terminals
8 DIG. BOTHWAY	LM8	4 analogue extensions, 4 digital extensions
8 DIG. EXT.	LN8	8 digital terminals
4 ANAL.TK	LR4	4 analogue trunks
S0 S0 ISDN	LS1	2 S0 interfaces (S0 bus)
T0 S0 ISDN	LS1	1 S0 and 1 T0 interface (S0 bus and T0 access line)
T0 T0 ISDN	LS1	2 T0 access lines
TIE LINE	LI1	2 analogue tie lines
CA1	CA1	4 asynchronous V24 links
CS1	CS1	2 synchronous X25 links
LS2 T2	LS2	T2 trunk line (32 TS)
REDUCED LS2	LS2	T2 trunk line (16 TS)
PRI ISDN LT2 (32TS)	LT2	T2 trunk line (32 TS)
S2 ISDN LT2	LT2	S2 trunk line (32 IT)
PRI ISDN LT2 (24TS)	LT2	T2 trunk line (24 TS)
PCM LT2 (32TS)	LT2	PCM digital trunk line (32 TS)
T1 PCM LT2	LT2	PCM digital trunk line (24 TS)
BVF	BVF	IVB and synchronous announcements
XX CHANNEL PTX	PT2	TCP/IP-X25 and tunneling gateway
	CC1	Synchronous announcements (16 minutes)
LD4	LD4 or LD4N	4 ISDN interfaces (S0 or T0) or 4 DECT base stations
	LH8	8 analogue hotel terminals for sets with message lamps
	LR4-DTOC	4 analogue + DTOC trunk lines
	BTX	4000 record call charging buffer
	CP1	2 packet-mode data transmission links
	ADPCM	LD4/LDS daughter card for 2 base stations
	ADPCM 16	LD4/LD4N daughter card for 4 base stations
	LS0	1 T0 interface
	RL1	ICS router
	CHP1	1 parallel interface for PC

Expanding the M6501R IP PBX

Power off

Power off the system before opening the cabinet.

Adding an expansion shelf

Textual specification

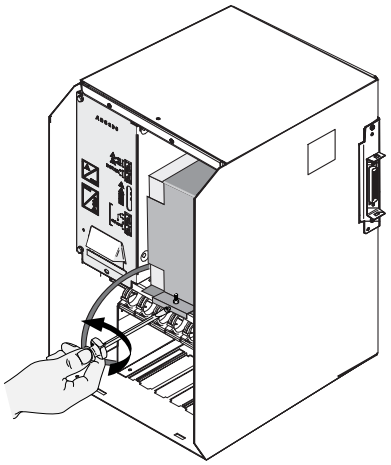
Add an expansion shelf, providing up to eight additional card slots.

Comments

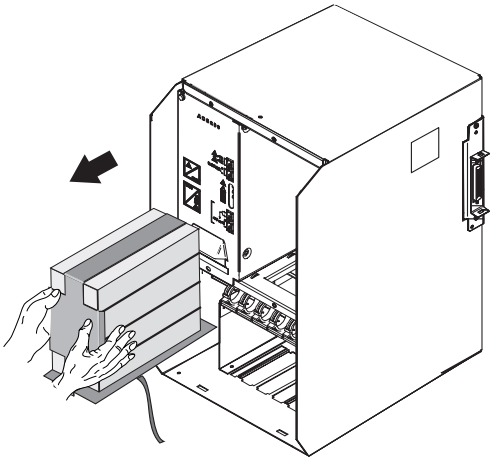
- The internal battery must be replaced with an external battery if a shelf is added to an M6501R IP PBX cabinet.

Steps

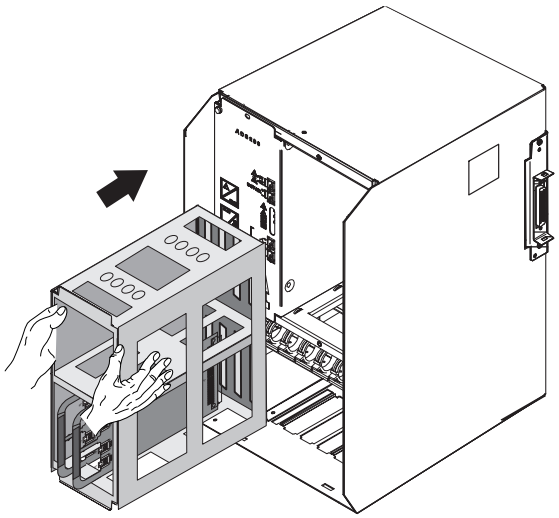
1. Back up the site configuration.
2. Power off power the system (battery + mains). Remove the front cover of the cabinet.
3. Remove the internal battery retaining screw.



4 Disconnect the internal battery and remove it from the cabinet.



5 Install the expansion shelf. Secure the shelf in place with the screws provided.



6 Insert the cards in the new shelf and connect them as required.

7 Close the front cover of the cabinet.

8 Power on the system.

9 Perform a full system reset to declare all the new cards and put them in service.

10 Restore the saved configuration and program the new components.

Upgrading from an M6501R IP PBX to an M6501L IP PBX

Power off

Power off the system before opening the cabinet.

Textual specification

The aim of this procedure is to describe how to upgrade from an M6501R IP PBX to an M6501L IP PBX. This operation is necessary if an expansion cabinet is to be fitted to an M6501R IP PBX. New power supply modules are required for the main cabinet:

- a dedicated uninterruptible AC/DC power supply
- an external battery

Steps

1. On the M6501R IP PBX, power off the cabinet (battery + mains). Remove the front cover of the cabinet.
2. Disconnect and remove the internal battery from the cabinet.
3. Disconnect and remove the uninterruptible AC/DC power supply from the cabinet.
4. Install and secure a new uninterruptible AC/DC power supply, dedicated to the M6501L IP PBX, in the cabinet. Do not power on the uninterruptible AC/DC power supply.
5. Install the expansion shelf and secure it in place with the screws provided.
6. Insert the circuit cards in the new shelf and connect them as required.
7. Install a new backup battery, specific to the M6501L IP PBX, in the cabinet.
8. Close the front cover of the cabinet.
9. Power on the uninterruptible AC/DC power supply.

When adding a cabinet and an expansion shelf (shelf 3), follow the procedures in *Adding an expansion cabinet*.

Expanding the M6501L IP PBX

The M6501L IP PBX can be expanded by :

- adding an expansion shelf (shelf 1) in the main cabinet
- adding an expansion cabinet (including shelf 2)
- adding an expansion shelf (shelf 3) in the expansion cabinet

Adding an expansion shelf

Power off

Power off the system before opening the cabinet.

Textual specification

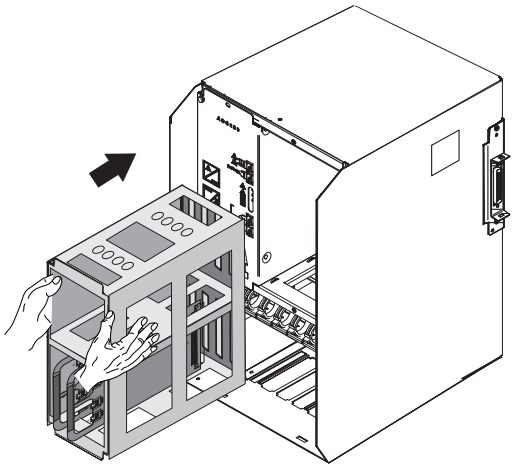
Add an expansion shelf, providing up to eight additional card slots. You can fit an additional shelf in the main or expansion cabinet.

Comments

- When a shelf is added to an expansion cabinet, all the cards installed must be declared and put in service before they become operational.

Steps

1. Back up the site configuration.
2. Power off power the system (batteries + mains).
3. Remove the front cover of the cabinet in which the shelf is to be installed.
4. Install the expansion shelf and secure it in place with the screws provided.



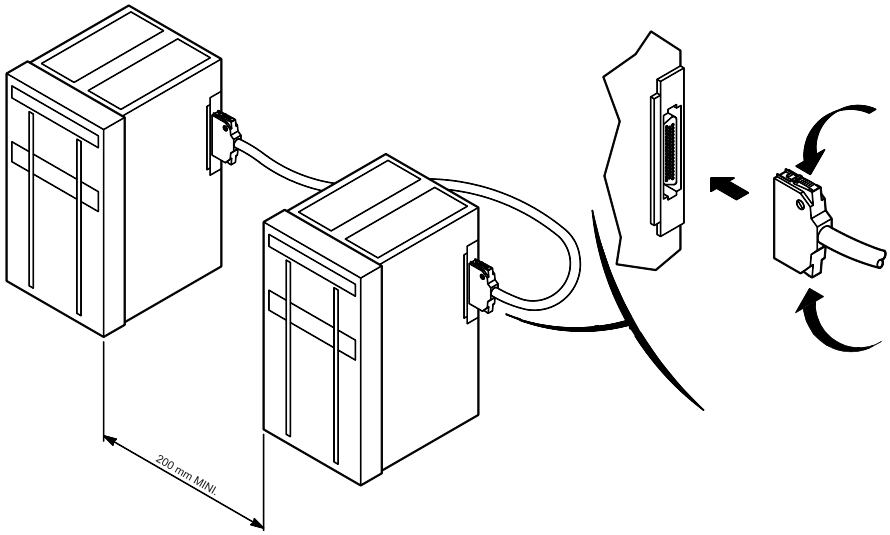
5. Insert the circuit cards in the new shelf and connect them as required.
6. Close the front cover of the cabinet.
7. Power on the system (batteries + mains).
8. Perform a full system reset to declare all the new cards and put them in service.
9. Restore the saved configuration and program the new components.

Adding an expansion cabinet

Power off

Power off the system before connecting the two cabinets.

The expansion cabinet is supplied with a bus extension cable, an uninterruptible electric power supply module and an ROCT3B bus expansion card.



☞ *Refer to Part 1 of this manual for full cabinet and card installation details.*

Steps

1. Unpack the expansion cabinet and secure it to the wall, 20 to 30 cm (8 to 12 inches) from the main cabinet.
2. Install the backup battery in the expansion cabinet.
3. Connect the expansion cabinet to the ground connection, but do not switch on the power supply.
4. Power off the main cabinet.
5. If an expansion shelf is to be fitted while expanding the system, install the shelf and insert its cards.
6. Close the front cover of the main cabinet and expansion cabinet.
7. Connect the bus extension cable to the main and expansion cabinets.
8. Switch on the expansion cabinet's uninterruptible power supply module.
9. Switch on the main cabinet's uninterruptible power supply module.

Additional data link

A data link requires an unused circuit card. If necessary, install and connect a new circuit card.

The table below shows the circuit cards that can be used to connect data terminals and set up data links.:

Circuit card	Data interface
CA1	4 asynchronous V24 interfaces
CS1	2 asynchronous X25 interfaces

Connecting the data link

Configure the card as specified in *Appendix A*.

Declaring the data link

To make the link operational, it must be assigned an extension number, then put in service.

To ensure that the ICS recognises the new terminal/data link:

1. Go to menu 2.1.1 (Link characteristics). The screen `LINK SELECTION` appears.
2. On the line `BY EQUIPMENT NUMBER`, enter the equipment number of the circuit card.
3. The system recognises the card installed (CA1 or CS1) and asks for the link type to be specified.
4. On the line `TYPE OF LINK`, select the link type. Press Enter.

Circuit card	TYPE	Terminal
CA1 (asynchronous V24)	PAD VIDEOPAD EBVO	PC M1B-CONNECTED M1B LOCAL SPTEL MINITEL CONNEC MINITEL LOCAL TTY VT100 TVI-955 WYSE -65
CS1 (synchronous X25)	PSDN HDLC LOCAL INTER NETWORK.	

5. The screen `LINK CHARACTERISTICS` appears. Change any characteristics required, to customise the link.
6. On the line `STATUS`, select `IN SERVICE`. Press Enter. The line `IN SERVICE` is displayed.

The connected data link or terminal becomes operational as soon as its status switches to "in service".

Additional trunk lines

When the capacity of the ICS is increased, traffic from the new extensions may saturate the existing trunk lines. To avoid this, you can install additional trunk lines.

Perform the following tasks to add a new trunk line:

- connect a trunk line
- declare the network junctor

Connecting a trunk line

Adding a new trunk line requires an unused circuit card. If necessary, install and connect a new circuit card.

The table below gives details of the trunk line circuit cards.

Trunk line	Circuit card
Analogue trunk line	LR4
Analogue private lines and tie lines (TL)	LI1
ISDN S0 (BRI) trunk line	LS1
ISDN T2 (PRI) trunk line	LT2
Private or leased line (PCM)	LT2

Description of external lines

The table below describes the various types of trunk line and the corresponding trunk groups, as set out on the ICS user interface.

Trunk line	Trunk group	Default group name
PCM digital trunk line	DIGITAL TRK	
Analogue trunk line	ANALOG.TRK	ANA.TG
Tie Line	TIE LINE	TLIE.TG
ISDN S0 (BRI) trunk line	ISDN: T0	PRI.TG
ISDN S2 (PRI) trunk line	ISDN: T2	PCM.TG

Assigning a trunk line to an existing trunk group

A trunk line must be associated with a trunk group of the same type; this can be an existing group or a new one can be created.

Note: *You cannot associate a trunk line with a trunk group of a different type.*

1. Go to menu 1.2.3 (Line characteristics) and select the location of the network card.
2. On the line `TRUNK GROUP`, select the existing trunk group. Press Enter.

Note: *An ISDN T0 (BRI) trunk line has two B channels. Each of these can be assigned to a different T0 trunk group. On the relevant lines, select either* `TRUNK GROUP 1ST B CHANNEL` *or* `TRUNK GROUP 2ND B CHANNEL`*.*

3. On the line `STATUS DISABLED`, select `IN SERVICE`. Press Enter.

The trunk line is now assigned to an existing trunk group, and becomes operational immediately.

Adding a trunk line to a new trunk group

The trunk line is assigned to a new trunk group that must be routed to it.

1. Go to menu 1.2.2.1 (Trunk group names). The screen `TRUNK GROUP NAMES` appears.
2. Enter a single name per unused line.
3. Go to menu 1.2.2.2 (Trunk group characteristics). The screen `TRUNK GROUP SELECTION APPEARS`. Select the new trunk group. Press Enter. The screen `CHARACTERISTICS OF TRUNK GROUP <NAME>` appears.
4. On the line `PHYSICAL TYPE`, select the trunk line type. Press Enter.
5. Modify any of the trunk line's characteristics as required, then define the route taken by the new trunk group.

Additional sets

Adding a new extension requires an unused circuit card. If necessary, install and connect a new circuit card.

The table below gives details of the circuit cards for digital and analogue.

Circuit card		Terminal or set
LA4 LA8 LM8	(4 analogue sets) (8 analogue sets) (4 analogue and 4 digital sets)	analogue set (telephone, fax machine, answering machine or modem)
LN4 LN8 LM4 LM8 ROCT3B OCT4	(4 digital sets) (8 digital sets) (2 analogue and 2 digital sets) (4 analogue and 4 digital sets) (16 digital sets) (4 digital sets - keep these lines for backup purposes)	Dedicated digital terminals EADS TELECOM

When connecting an additional set to a circuit card, check:

- that the card is fitted correctly
- that the card has been declared and its status is defined as `IN SERVICE` (menu 3.2 Card management).

Perform the following tasks to add a new set:

- connect the set
- declare the new set

Connecting the set

You need to connect the analogue or digital set in accordance with the instructions in *Part 1*.

IMPORTANT
Do not make connections to the M6501L IP PBX with the power switched on.
Short-circuits caused as the connection is made could damage the system's circuit cards.

Declaring the set

To make the set operational, it must be assigned an extension number, then put in service. You can customise the new set by modifying the extension characteristics .

The system may need to identify the new set.

1. Go to menu 1.1.1 (Extension characteristics). The screen `EXTENSION SELECTION` appears.
2. On the line `BY EQUIPMENT NUMBER`, enter the equipment number. The screen `EXTENSION CHARACTERISTICS` appears.
3. On the line `SUBSCRIBER STATUS`, select `IN SERVICE`. Press Enter.

Upgrading the software

IMPORTANT
Downloads must be performed when there is no traffic.
While upgrading the software, all internal and outgoing calls are suspended throughout the procedure.

Expanding the hardware increases the capacity of the system, whereas software upgrades add new functions to the configuration and/or allow the latest cards to be used by the ICS.

The ICS software is initially loaded and tested at the factory. It is then upgraded when necessary.

The software is upgraded using a PC connected to the parallel port on the ICS. The XMODEM protocol is used to ensure safe, secure data transfer.

On-site upgrades

System backup

Back up the customer configuration before each ICS upgrade.

Hardware required in order to upgrade the software

- The CHP1 card : parallel download card. During the upgrade, this card fits in one of the general purpose slots.
- An X86 or Pentium PC (for upgrade tools management), with:
  - a hard disk
  - a 3.5" floppy disk drive
  - a CD-ROM drive
  - DOS or Windows
  - a parallel input/output connector (usually called a parallel port).
- A 25-pin cable: This cable should not be more than 3 meters long and is used to establish the physical link between the PC and the CHP1 card.
- A VT100 console or PC (to access the user interface).
- A 25- or 9-pin cable: This cable is used to establish the physical link between the VT100 console or PC and the serial communications port in the ICS.
- The upgrade software kit.

Upgrading the ICS software

Textual specification

This procedure involves loading new software versions onto the ICS.

The ICS software is made up of two parts:

- the **System** software which initialises and configures the processor card
- the **Application** software which contains the ICS functions (configuration programs and installation parameters)

Considerations

- The ICS software is upgraded using "**DOS tools**".

Note: *The minimum version of DOS tools for R2.1 is **11AT**.*

- To upgrade the ICS software, the CHP1 card must be installed and the PC must be connected to the parallel port of this card.
- The task list below is only for upgrading software on site.
- System software upgrades are not dependent on application software upgrades. However, the system software and application software must be compatible.
- The installation and VU (Version Update) processing steps do not apply if you are upgrading the system software.
- the ICS software can be supplied either on diskette or CD-ROM.

Steps

1. Backup the site configuration using the user interface.

   The backup takes place "*on line*". There is no Auto Reset of the system and the calls in progress are not interrupted.

2. Load the **system** software, if required.
   - The system software to be installed should be compatible with the application software installed or to be installed.
   - Check the system software release using the user interface (menu 5.4.1).
3. Load the **application** software, if required.
   - The application software to be installed should be compatible with the system software installed or to be installed.
   - Check the application software release using the user interface (menu 5.4.1).
4. **Install the VUs on the PC** (this operation is not necessary if the software is supplied on CD-ROM)

   On the PC, in WINDOWS, proceed as follows:
   - Open an MSDOS window.
   - Go to **C:\OUTIPC**.

- Type `MENU` and validate by pressing Enter. The window `PC TOOLS SELECTION` appears.
- In the `PC TOOLS SELECTION` window, select the line `VUS INSTALLATION ON PC`
- Validate the selection by pressing Enter.

  Note: *The name of the screen changes to:* `INSTALLING THE VUS ON THE HARD DISK.`

- Insert the **Chaining** diskette into drive A and press Enter twice.

5 The proposed installation directory is **C :\vu_F1**. If this directory is suitable, press Enter to confirm the creation of this directory.

At the same time all the diskettes that can be transferred are displayed on the screen.

- When the message `SELECT THE FLOPPY DISKS TO TRANSFER` is displayed on the screen, select MAJ PAS (PAS update) using the arrow keys. Press **Ins** to validate the choice of diskettes. Validate by pressing Enter.
- When the message `CONFIRM SETTINGS?` is displayed on the screen, press Enter. The message `TRANSFER IN PROGRESS !!!` is displayed.
- At the message `INSERT THE FLOPPY DISK <FLOPPY DISK NAME>`, remove the Chaining diskette and insert the first diskette to be transferred. Validate by pressing Enter. The message `INSERT THE FLOPPY DISK <FLOPPY DISK NAME>` is displayed for each diskette to be transferred.
- The message `INSTALLATION COMPLETE !!!` signals the end of the installation. Press ESC to return to the `PC TOOLS SELECTION` screen. Remove the diskette to be transferred.

You are advised to continue the procedure from step "**6 : Running the VUs"** without exiting the"DOS Tools" program.

6 **Running the VUs** (Updating the customer configuration)

On the PC, in Windows:

- If the software is supplied on diskettes, insert the **Chaining** diskette in the floppy drive.
- If the software is supplied on CD-ROM, insert the CD-ROM in the CD-ROM drive.

Note: *If the* `PC TOOLS SELECTION` *window is already displayed, ignore the first three steps.*

- Open an MSDOS window.
- Go to **C:\OUTIPC**.
- Type `MENU` and validate by pressing Enter. The window `PC TOOLS SELECTION` appears.
- In the `PC TOOLS SELECTION` window, select the line `PROCESSING VUS`. Press RETURN to confirm.

  Note: *The name of the screen changes to:* `CUSTOMER CONFIGURATION UPDATING`

- If the software is supplied on diskette, select the directory **C:\VU_F1\Chaining diskette reference** and press RETURN to confirm.
- If the software is supplied on CD-ROM, enter the full directory access path on the CD-ROM: ***.nRP** (where n = 1, 2, 3, ... according to the number of software productions for each step) and press RETURN to confirm.
- Indicate the path for the customer configuration file (initial configuration which must be on the hard disk) and its name.
- Indicate the path for configuration file after the VUs have been run and its name (final configuration). Press RETURN to confirm.
- Select the software version you wish to install and press RETURN to confirm.
- When the upgrade is complete, press Esc to go back to the menu `PC TOOLS SELECTION`.

  Note:*The new customer configuration file is to be restored in the ICS (Menu 5.2).*

7 Restore the customer configuration.

The configuration is restored "*off line*". The system is stopped during this step and an Auto Reset is performed. Any calls in progress are interrupted.

- Reset the ICS.
- Press ESC to exit the "DOS Tools" program.

  Note: *The chaining of these phases is to be defined according to the type of upgrade.*

Chapter 3 - Maintenance and troubleshooting

This part describes the maintenance service features of the M6501L/R IP PBX and the procedures for troubleshooting faults.

This part is divided into two:

- *Maintenance*

  This section provides a general description and explains the operating procedure for maintenance service features.

- *Troubleshooting*

  This section describes the precautions to be taken before carrying out hardware maintenance and includes flowcharts on troubleshooting procedures.

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Maintenance service features

This chapter provides a general description and describes the operating procedure of the maintenance service features. The features described in this chapter are shown below.

- Fault messages
- Logical security blocks
- Configuring maintenance services

Fault messages

Messages appear in the logbook (menu 4.4 - Logbook display).

They inform the operator that the maintenance software has detected an event to be monitored.

When a fault is detected in the configuration, a fault record is recorded in the logbook. Fail safe action is decided on and executed by the maintenance software.

A fail safe action report message is then recorded in the logbook.

Note: *The logbook displays additional information such as M7500 records, call billing, etc. (see SMDR for more details).*

The maximum number of fault messages that can be stored is 100. If the stored information exceeds 100, the storing method is new data overwriting. Fault information is displayed in reverse message order "last in, first out". The screen title gives the number of the page displayed on the total number of pages stored. A maximum of 10 pages can be displayed by the logbook. Printout of a logbook page is possible through the printer connected to the operating console. Printout is by manual request only.

Description of a fault record

There are four types of errors that generate a fault report:

- software errors detected by a software module
- software errors detected by the operating system
- errors detected in a file in a hard disk RAM directory
- hardware errors detected on a card or a peripheral terminal

Each of these types of errors produces a different format of error. These formats are described in the following sections.

- **Software errors detected by a software module**

  This type of error can only be used by software development personnel. The information it contains indicates an error on an item of data received by a program or an incorrect status detected in a program.

```
*ERR    0201*PCS    0*LC
50454*PCD 000*IND 01
 02 0E 02 00 00 00 00 00
```

  Each item of information has a meaning:

ERR	Error number of the fault. See Appendix C for the meaning of each number.
PCS	Processor number. 0 indicates the CPU card and a number from 1 to 16 indicates a daughter card.
LC	Identification number of the program that detected the fault.
PCD	Software procedure number.
ND	Index used to identify the location of the instruction in the program.
Any additional fault-related information, displayed in a byte string, is listed after the Index code.	

- **Software errors detected by the operating system**

  This type of error has two parts: the error code and additional error information. The error code is the four-digit number that immediately follows the identifier ERROR.

```
***ERROR:0214
04 80 00 01 00 02 00 03 00 04.....
```

  For a description of the error codes, refer to Appendix C. The additional information provided will vary depending on the error code.

- **Errors detected in a file**

  These errors are generated by programs that handle files located in hard disk RAM directories:

```
*ERR 020D*PCS 0*LC 50454*PCD 000*IND 01
02 0E 02 00 00 00 00 00  35 72 ...
30 32 35 36 41 42 30 36 30 32 ...
..../UTD/DATA/ML/VQ50256AAB0602
```

  The fault record recorded in the logbook contains:

ERR	Error number. See Appendix C for the meaning of each number.
PCS	Processor number. 0 indicates the OCX card.
LC	Identification number of the program that detected the fault.
PCD	Software procedure number.
IND	Index used to identify the location of an instruction in the program.
Any additional fault-related information, displayed in a byte string, is listed after the Index code.	

- **Hardware error**

  This type of error message is generated when an event is detected on a card, card component, or any other hardware part monitored by the software. A hardware device is any device that has a software manager.

```
***ERR0R:0604
*******LA6: 0, 0, ..
```

  The fault record associated with a hardware device and recorded in the logbook contains:

ERROR	Error number of the fault. See Appendix C for the meaning of each number.
*******LA6	Type of hardware device.
HARDWARE DEVICE NUMBER	Number of faulty hardware device.
Any additional fault-related information, displayed in a byte string, is listed after the hardware device number.	

Fail safe action report

When an error is detected, automatic maintenance can take fail safe action. The action consists in changing the status of the security block that encompasses the faulty hardware device and generating a report:

```
******LA6 :0, 0, ..  ** FAULTY  **
```

The fail safe action report recorded in the logbook contains:

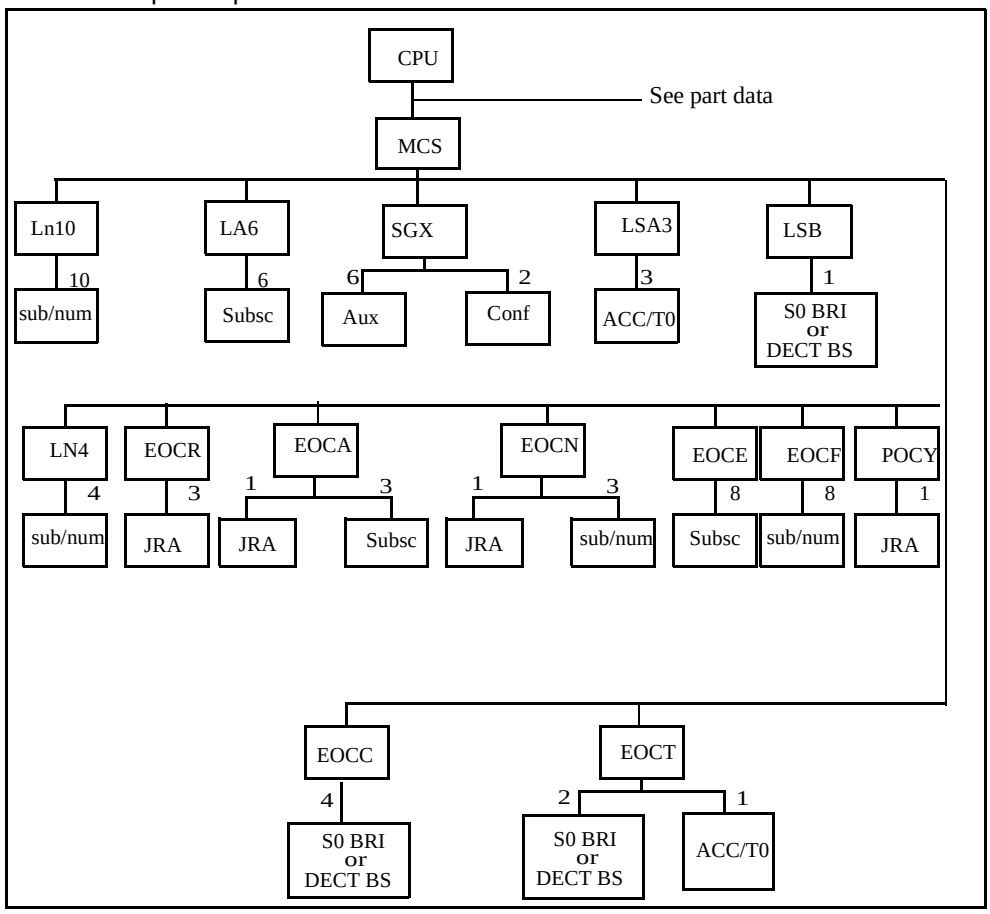
- the type of security block that changed status
- the security block number
- the new logical security block status

Logical security blocks (LSB)

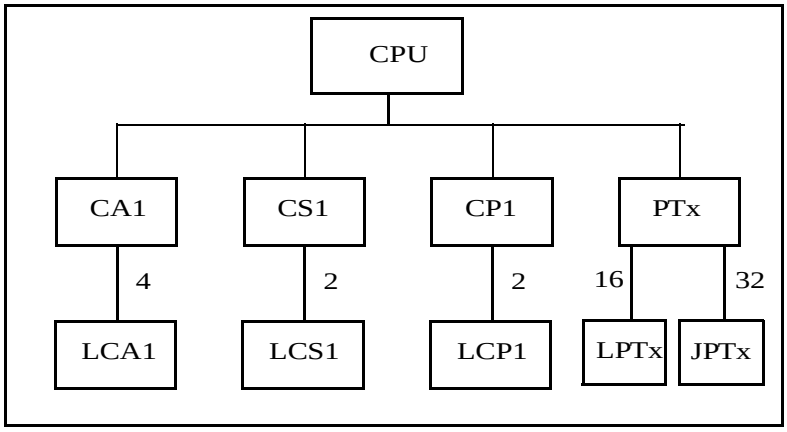
Automatic maintenance sees the configuration as a set of hierarchically arranged logical security blocks (LSB).

Breakdown of hardware and software into security blocks

- LSB-Telephone part



- LSB – Data part



Description of security block number

Type of LSB	(Rank) number of LSB	
CPU	0	
MCS	0	
IA1	0≤N≤15	
JA1	IA1 No., N	0≤N≤1
LR1, LR2	0≤N≤15	
JR1	card No., N Card = LR1 Card = LR2	 0≤N≤1 0≤N≤3
SGX	N=0	
AUX	SGX No., N	0≤N≤5
CONF	SGX No., N	0≤N≤1
LA1, LA2	0≤N≤15	
LN1, LN2	0≤N≤15	
LM1, LM2	0≤N≤15	
PTx, LPTx	0≤N≤15	
JPTx	16≤N≤47	
SUBSCRIBER	card No., N Card = LA1, LM1 Card = LA2, LM2	 0≤N≤3 0≤N≤7
SUB/NUM	card No., N Card = LN1, LM1 Card = LN2, LM2	 0≤N≤3 0≤N≤7
LS1-A	0≤N≤15	
LS1-B	0≤N≤15	
LS1-C	0≤N≤15	
ACC/T0 or DECT BS (base station)	LS1 No., N	0≤N≤1
ACC/T0	LS1 No., N	0≤N≤1
LS2_T2	0≤N≤2	
ACC/S2 ACC/T2	 LS2_T2 No., N.	 0≤N≤1
LB4	0≤N≤15	
BS (Base station)	LB4 No., N	0≤N≤3
LT2_T1	0,1,4,5	
LT2_RTC	0,1,4,5	
MIC_LT2_T1	LT2_T1 No., N	N=0
MIC_LT2_RTC	LT2_RTC No., N	N=0
JRN_LT2_T1	LT2_T1 No., N, J	N=0, 1≤J≤24
JRN_LT2_RTC	LT2_RTC No.,N, J	N=0,1≤J≤31 with J#15

Description of LSB statuses

When an error is detected, automatic maintenance can take fail safe action. The action consists in changing the security block status. The statuses have the following meaning:

- **NOT EQUIP.** LSB not equipped in associated configuration table.
- **OUT OF SRV** LSB does not participate in normal operation because it cannot be accessed by software. This occurs, for example, when the LSB one step up in the hierarchy is faulty.
  This status is also the initial status of all LSBs before startup.
- **DOWNLOAD** Processor associated with LSB is being downloaded.
- **IN SERVICE** LSB participates in normal operation.
- **FAULTY** Error detected in an LSB function. The LSB is removed from normal operation by automatic maintenance.
- **DISABLED** Maintenance operator removed LSB from normal operation using an MMC.

Other special statuses:

- **IN PARKING** A telephone subscriber did not hang up their set (off-hook)

Configuring maintenance services

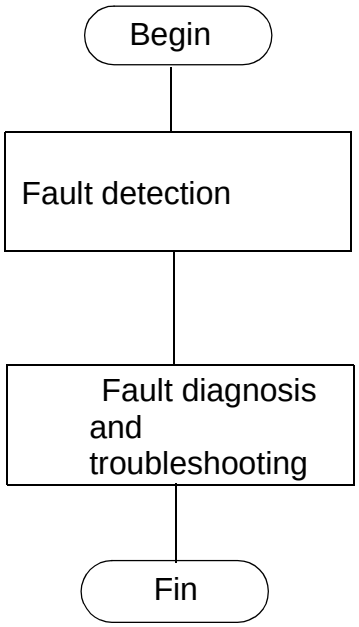
The PBX has a built-in maintenance program that offers diagnostic services such as fault message generation, device status information, and fail safe action. The program monitors the status of all connected devices. Additionally, when no response or an invalid response from a device is received, this program disables the faulty device and stores the slot number of that device in the memory.

Note : No programming is required for enabling diagnostic feature.

Setting up fault information storage

1. Enable the fault record storage feature.
   No programming is required for enabling the fault information storage.
2. Assign the type of fault record stored into the fault record memory. By default, certain types of fault records stored into the memory, such as logbook erased, card down, etc., cannot be changed.
   In menu 4.1 (Administration parameters - Alarm validation), set what kinds of additional information will be stored into the memory.

The outline of the recommended troubleshooting procedure is:



Fault detection method:

- alarm indication
- lamp indication on circuit cards
- complaint from station user or attendant

Fault diagnosis and troubleshooting method:

- display on operating console
  - fault message
  - extension line status display
  - external line status display
- lamp indication on circuit cards
- nature of complaint from extension user or operator

Fault detection

This section describes the way in which alarm indications are given. If a fault has occurred in the system, maintenance personnel can detect the fault by:

- **Alarm indication**
  By providing an external alarm indication, the system can route the alarm signal to a maintenance set or to additional equipment such as an alarm bell. The external alarm device must be installed and setup. External alarm indication is provided using a contact-to-ground at the main distribution frame. For more details, see Appendix A, *OCT4 card description*.
- **Lamp indication on circuit cards**
  When a fault has occurred in the system, maintenance personnel can also detect the fault by lamp indication on circuit cards. For details of lamp indication on circuit cards, see *Appendix A*.
- **Fault detection by complaint from an extension user or an operator**
  When a maintenance person receives a complaint about a problem from an extension user or an operator, the maintenance person should collect as much information on the problem as possible, and then troubleshoot the problem according to the procedure shown in this chapter.

Fault diagnosis and troubleshooting

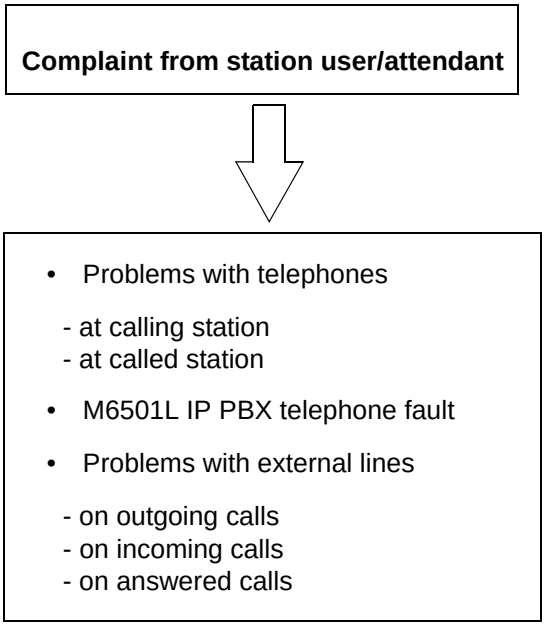
Troubleshooting by fault records

When the alarm has been indicated, maintenance personnel can diagnose the nature of the fault by the fault message and status display features which are displayed on the operating console, and restore the fault.

Troubleshooting by lamp indication on circuit cards will be described in the next version.

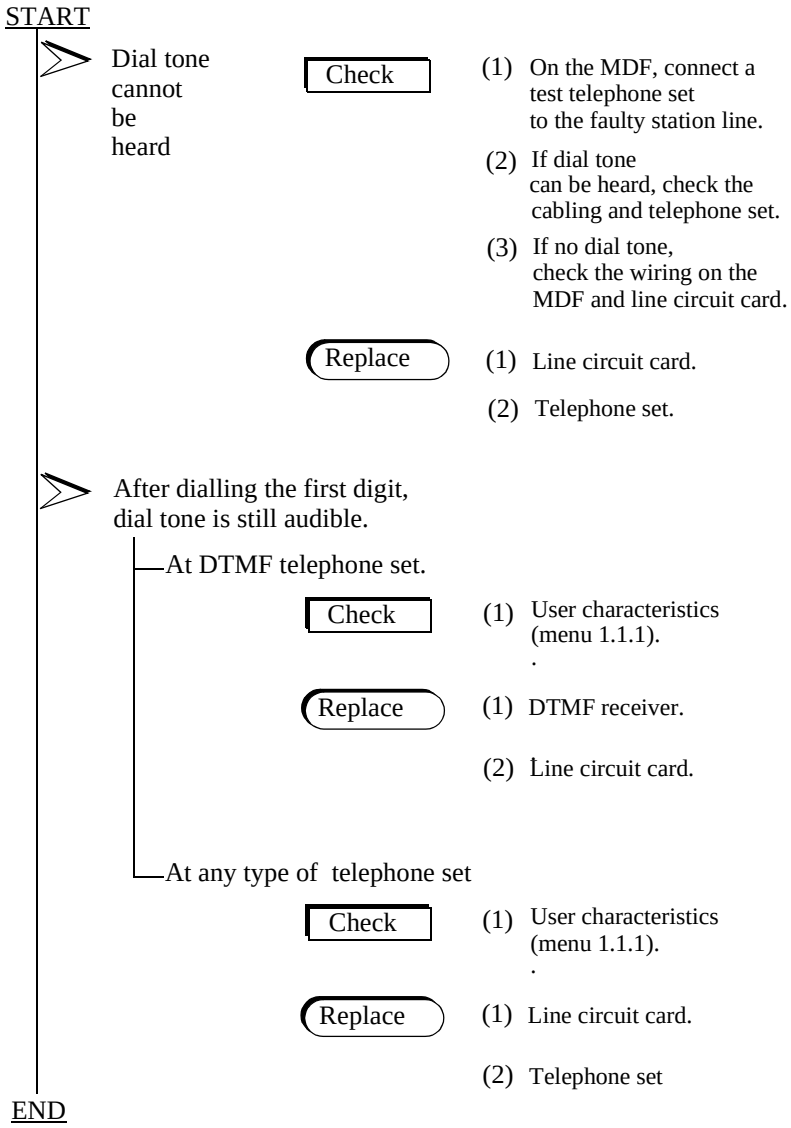
Trouble-shooting by nature of complaint

When a maintenance person receives a complaint about a problem from a station user or an attendant, select the appropriate section corresponding to the problem as shown in the figure below, and trouble-shoot.

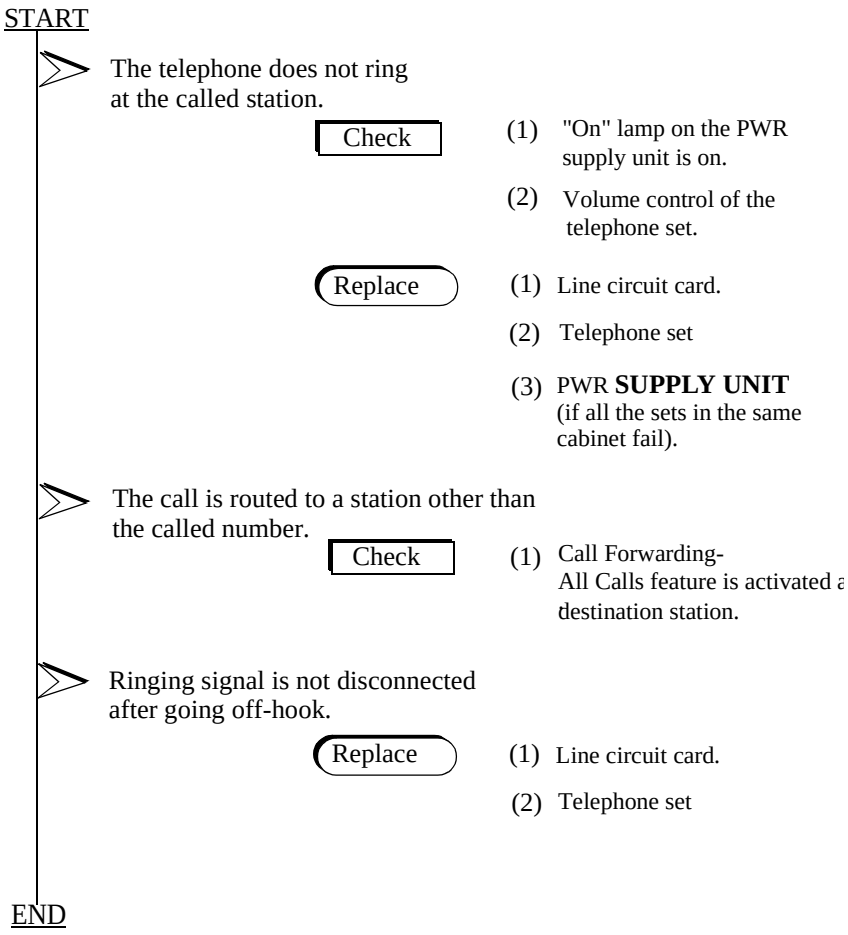

Complaint from station user/attendant
• Problems with telephones
- at calling station
- at called station
• M6501L IP PBX telephone fault
• Problems with external lines
- on outgoing calls
- on incoming calls
- on answered calls

Problems with telephones

At calling station:


START
Dial tone cannot be heard
Check
(1) On the MDF, connect a test telephone set to the faulty station line.
(2) If dial tone can be heard, check the cabling and telephone set.
(3) If no dial tone, check the wiring on the MDF and line circuit card.
Replace
(1) Line circuit card.
(2) Telephone set.
After dialling the first digit, dial tone is still audible.
At DTMF telephone set.
Check
(1) User characteristics (menu 1.1.1).
Replace
(1) DTMF receiver.
(2) Line circuit card.
At any type of telephone set
Check
(1) User characteristics (menu 1.1.1).
Replace
(1) Line circuit card.
(2) Telephone set
END

At called station:


START
The telephone does not ring at the called station.
Check
(1) "On" lamp on the PWR supply unit is on.
(2) Volume control of the telephone set.
Replace
(1) Line circuit card.
(2) Telephone set
(3) PWR SUPPLY UNIT (if all the sets in the same cabinet fail).
The call is routed to a station other than the called number.
Check
(1) Call Forwarding- All Calls feature is activated a destination station.
Ringing signal is not disconnected after going off-hook.
Replace
(1) Line circuit card.
(2) Telephone set
END

Replacing the fuses

Textual specification

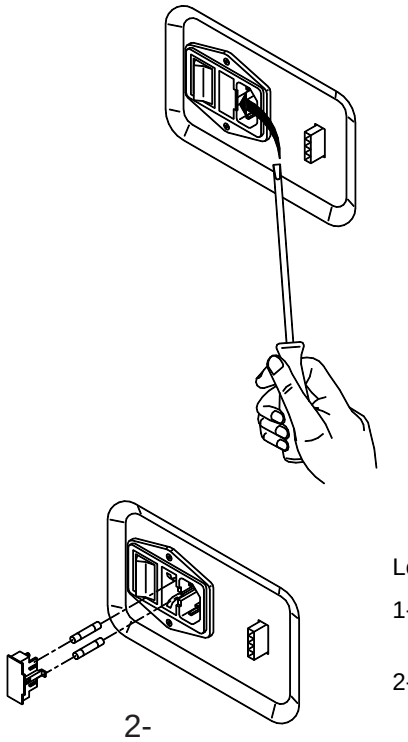
Two T 3.15, 15 H fuses are integrated in the M6501L/R IP PBX ADS300 power supply module, to protect the equipment when power surges occur. After finding the cause of the power surge, use the following procedure to change the fuses in the ICS.

Steps

1 **Power off the PBX.**

Unplug the power cord and external battery connector from the ADS 300.

2 On the ADS 300, remove the cover of the fuse holder located between the on/off switch and the mains power connector. Use a tool (for example a small flat screwdriver) as a lever, as shown in the diagram below.



Legend:

1- Remove the cover of the fuse holder using the screwdriver

2- Remove the fuse holder and the fuses

3 Remove the fuse holder and the damaged fuse(s).

4 Insert the new fuses in the fuse holder.

5 Replace the fuse holder in the ADS 300, and replace the cover by pressing firmly.

6 Reconnect the power lead and the battery connector.

7 Power on the ICS.

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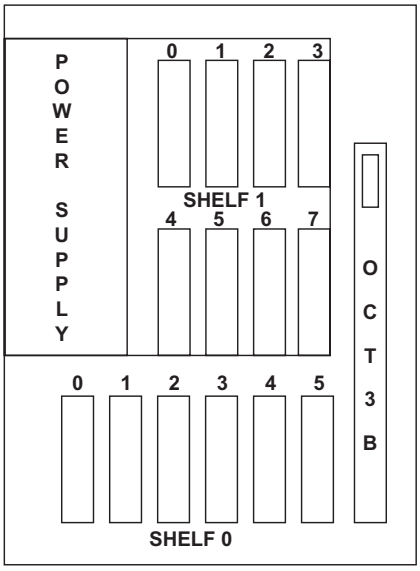
Appendix A: Description of cards

Architecture of the M6501L IP PBX cabinets

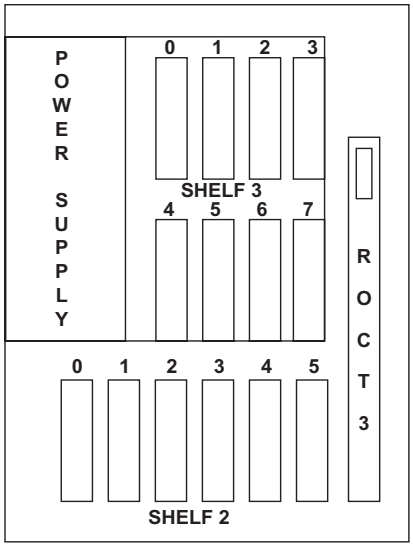


Main Cabinet

This cabinet is equipped with a basic shelf (shelf 0), containing six card slots numbered 0 to 5.

An optional shelf (shelf 1) can be added to provide eight slots numbered 0 to 7.

The M6501R IP PBX only has shelf 0.



Expansion cabinet

An expansion cabinet with the same architecture as the main cabinet can be connected to the main cabinet.

It is equipped with a basic shelf (shelf 2), containing six card slots numbered 0 to 5.

An optional shelf (shelf 3) with eight slots numbered 0 to 7 can also be added.

All the cards described in this appendix are common to both the M6501R IP PBX and M6501L IP PBX.

Correspondence between slots and MMCs

The address of a device on a card comprises two physical addresses and a logical address.

The first address is the number of the shelf in which the card is fitted.

The second address is the number of the slot in which the card is fitted.

The third address is given by the MMC which assigns an equipment number.

Example:

- if a CA1 card is installed in shelf 0 of the main cabinet in position 3, its address will be < 0 > - < 3 > - < equipment number (0 to 3) >
- if a CA1 card is installed in shelf 1 of the main cabinet in position 4, its address will be < 1 > - < 4 > - < (0 to 3) >

Card locations

Main cabinet

The following tables show the positions of the various cards of the M6501L IP PBX in the shelves of the main cabinet.

Shelf 0

Card	0	1	2	3	4	5
CA1, CS1, CHP1 and CP1	YES	YES	YES	YES	YES	YES
CC1 – 8TS	YES	YES	YES	YES	YES	YES
CC1 - 32 TS	YES	YES	NO	NO	YES	YES
LA4 and LA8	YES	YES	YES	YES	YES	YES
LD4	YES	NO	YES	NO	YES	NO
LI1	YES	YES	YES	YES	YES	YES
LM4 and LM8	YES	YES	YES	YES	YES	YES
LN4 and LN8	YES	YES	YES	YES	YES	YES
LR4	YES	YES	YES	YES	YES	YES
LS0	YES	YES	YES	YES	NO	NO
LS1	YES	YES	YES	YES	YES	YES
LT2	YES	YES	NO	NO	YES	YES
MVD	NO	NO	NO	YES	YES	YES
BVF/BVF2	NO	YES	NO	NO	YES	YES
i-MUX 01	YES	YES	YES	YES	YES	YES
PT2, PT2+VOIP4(E)-8	YES	YES	YES	YES	YES	YES
PT2+VOIP4(E)-16	YES	NO	YES	NO	YES	NO
PT2+VOIP4(E)-32	YES	YES	NO	NO	YES	YES

Shelf 1

Card	0	1	2	3	4	5	6	7
CA1, CS1, CHP1 and CP1	YES	YES	YES	YES	YES	NO	NO	NO
CC1 – 8TS	YES	YES	YES	YES	YES	YES	YES	YES
CC1 - 32 TS	NO	NO	NO	NO	NO	NO	NO	NO
LA4 and LA8	YES	YES	YES	YES	YES	YES	YES	YES
LD4	YES	NO	YES	NO	YES	NO	NO	NO
LI1	YES	YES	YES	YES	YES	YES	YES	YES
LM4 and LM8	YES	YES	YES	YES	YES	YES	YES	YES
LN4 and LN8	YES	YES	YES	YES	YES	YES	YES	YES
LR4	NO	YES	YES	YES	NO	YES	YES	YES
LS1	NO	YES	YES	YES	NO	NO	NO	NO
LT2	NO	NO	NO	NO	NO	NO	NO	NO
BVF/BVF2	NO	NO	NO	NO	NO	NO	NO	NO
MVD	NO	YES	YES	YES	NO	YES	YES	YES
i-MUX 01	YES	YES	YES	YES	YES	NO	NO	NO
PT2, PT2+VOIP4(E)-8	NO	YES	YES	YES	NO	NO	NO	NO
PT2+VOIP4(E)-16	YES	NO	YES	NO	YES	NO	NO	NO
PT2+VOIP4(E)-32	NO	NO	NO	NO	NO	NO	NO	NO

Expansion cabinet

The following tables show the positions of the M6501L IP PBX various cards in the shelves in the expansion cabinet.

Shelf 2

Card	0	1	2	3	4	5
CA1, CS1, CHP1 and CP1	NO	NO	NO	NO	NO	NO
CC1 – 8TS	YES	YES	YES	YES	YES	YES
CC1 - 32 TS	NO	NO	NO	NO	YES	YES
LA4 and LA8	YES	YES	YES	YES	YES	YES
LD4	NO	NO	NO	NO	NO	NO
LI1	NO	YES	YES	YES	YES	YES
LM4 and LM8	YES	YES	YES	YES	YES	YES
LN4 and LN8	YES	YES	YES	YES	YES	YES
LR4	NO	YES	YES	YES	YES	YES
LS0	NO	NO	NO	NO	NO	NO
LS1	NO	NO	NO	NO	NO	NO
LT2	NO	NO	NO	NO	NO	NO
BVF/BVF2	NO	NO	NO	NO	YES	YES
MVD	NO	NO	NO	YES	YES	YES
i-MUX 01	NO	NO	NO	NO	NO	NO
PT2, PT2+VOIP4(E)-8	NO	NO	NO	NO	NO	NO
PT2+VOIP4(E)-16	NO	NO	NO	NO	NO	NO
PT2+VOIP4(E)-32	NO	NO	NO	NO	NO	NO

Shelf 3

Card	0	1	2	3	4	5	6	7
CA1, CS1, CHP1 and CP1	NO	NO	NO	NO	NO	NO	NO	NO
CC1 – 8TS	YES	YES	YES	YES	YES	YES	YES	YES
CC1 - 32 TS	NO	NO	NO	NO	NO	NO	NO	NO
LA4 and LA8	YES	YES	YES	YES	YES	YES	YES	YES
LD4	NO	NO	NO	NO	NO	NO	NO	NO
LI1	NO	YES	YES	YES	NO	YES	YES	YES
LM4 and LM8	YES	YES	YES	YES	YES	YES	YES	YES
LN4 and LN8	YES	YES	YES	YES	YES	YES	YES	YES
LR4	NO	YES	YES	YES	NO	YES	YES	YES
LS0	NO	NO	NO	NO	NO	NO	NO	NO
LS1	NO	NO	NO	NO	NO	NO	NO	NO
LT2	NO	NO	NO	NO	NO	NO	NO	NO
BVF/BVF2	NO	NO	NO	NO	NO	NO	NO	NO
MVD	NO	YES	YES	YES	NO	YES	YES	YES
i-MUX 01	NO	NO	NO	NO	NO	NO	NO	NO
PT2, PT2+VOIP4(E)-8	NO	NO	NO	NO	NO	NO	NO	NO
PT2+VOIP4(E)-16	NO	NO	NO	NO	NO	NO	NO	NO
PT2+VOIP4(E)-32	NO	NO	NO	NO	NO	NO	NO	NO

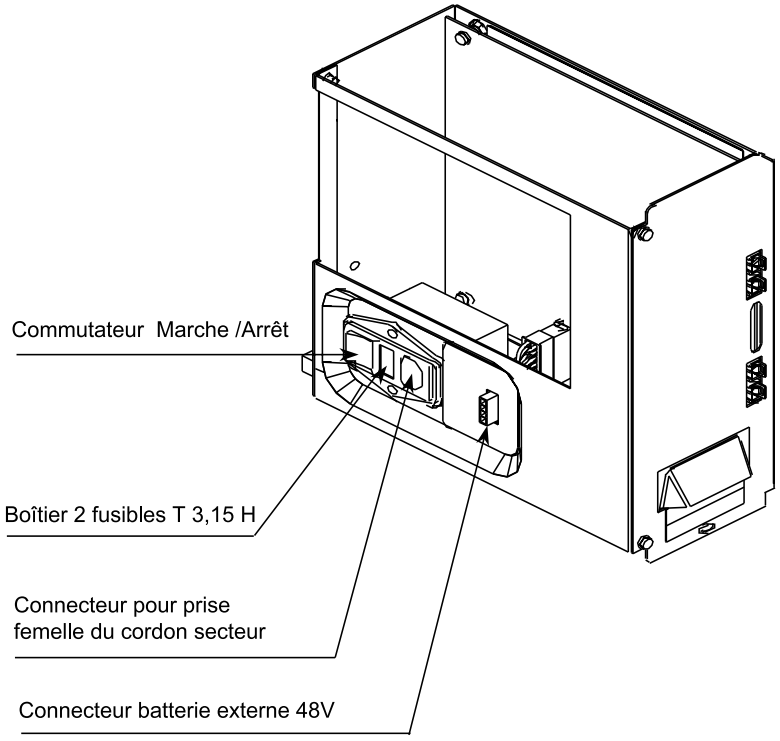
ADS300 power supply module (HR5981D)

The ADS300 is an AC/DC power supply module designed to replace the ADS200. The ADS300 complies with the electrical scheme, and has the following new features:

- an external 48 V battery cabinet
- an automatic battery sensor
- increased capacity on the +/- 5 V circuit and the 40 V remote power supply on the S0 bus
- a connector lead with a four-pin plug featuring a foolproofing mechanism to prevent polarity inversion when connecting the backup battery; the connector lead is supplied with the ADS300

IMPORTANT

The ADS300 power supply module is entirely compatible with the ADS200 power supply module. If you replace an ADS 200 power supply module with an ADS 300 module with a view to fitting CC1, LD4, LT2, or MDV cards, you need to have a main backplane with the following reference as a minimum: HJ 2523DB01.

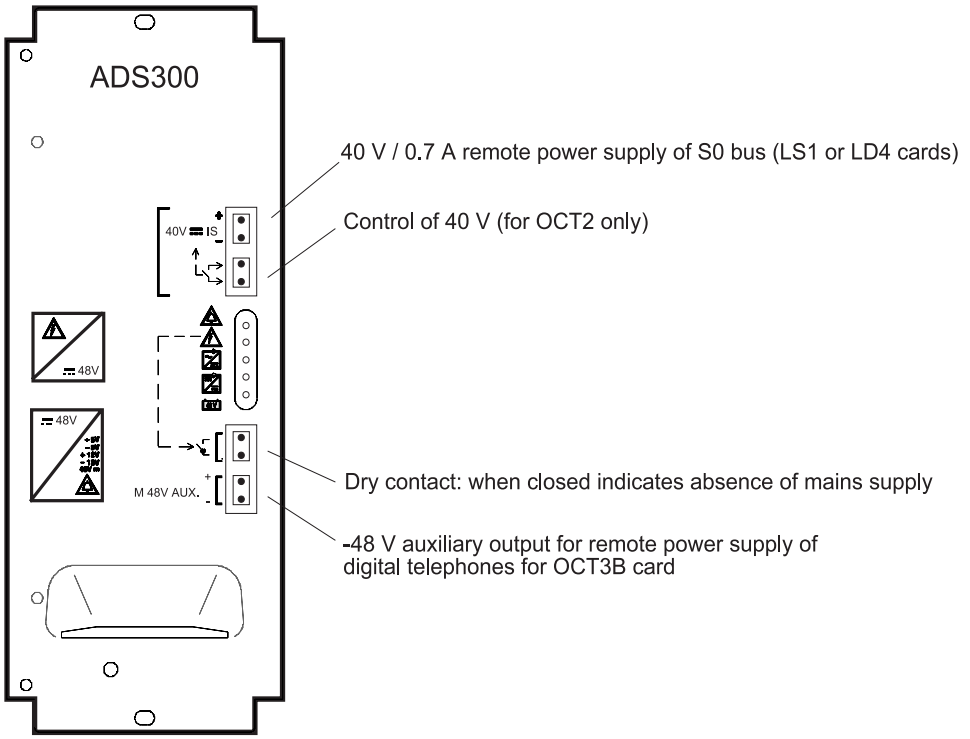

Commutateur Marche /Arrêt
Boîtier 2 fusibles T 3,15 H
Connecteur pour prise femelle du cordon secteur
Connecteur batterie externe 48V

The table below gives the main characteristics of the ADS300:

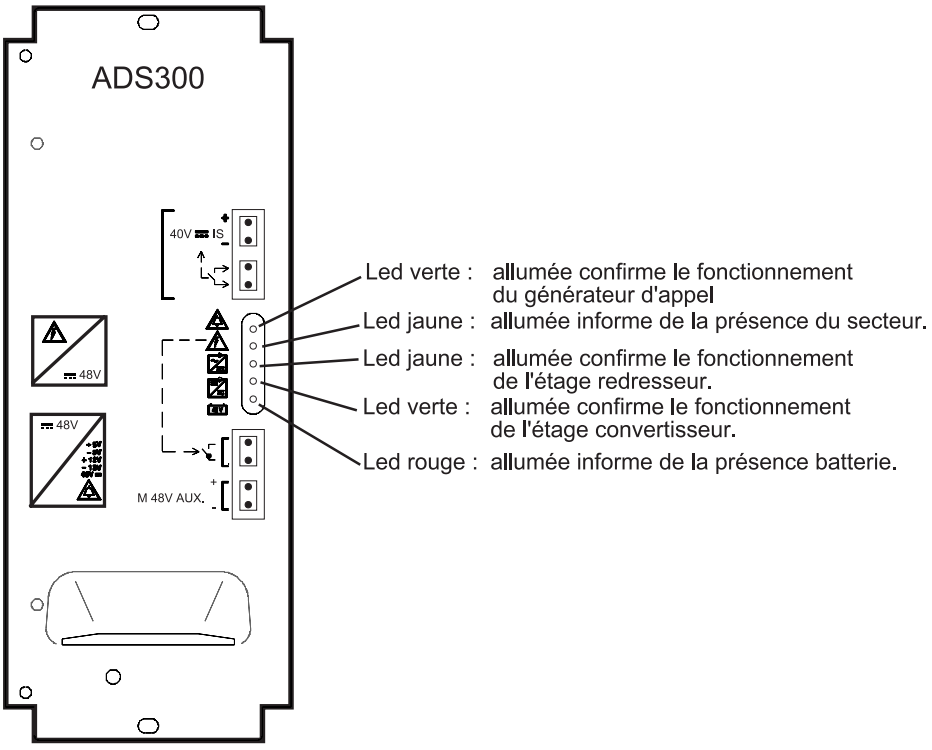
	ADS300
Mains power voltage	230 V (+/- 10%) 50-60 Hz
Power	300 W

	ADS300
Converter	
-48 V	4,5 A
+5 V	9 A
-5 V	0,8 A
+12 V	0,5 A
-12 V	0,3 A
40 V remote power supply (insulated to 3 kV)	0,7 A
25-50 Hz alarm	0,15 A (symmetrical current)
External backup battery	48 V

Description of the connectors on the front panel of the ADS300

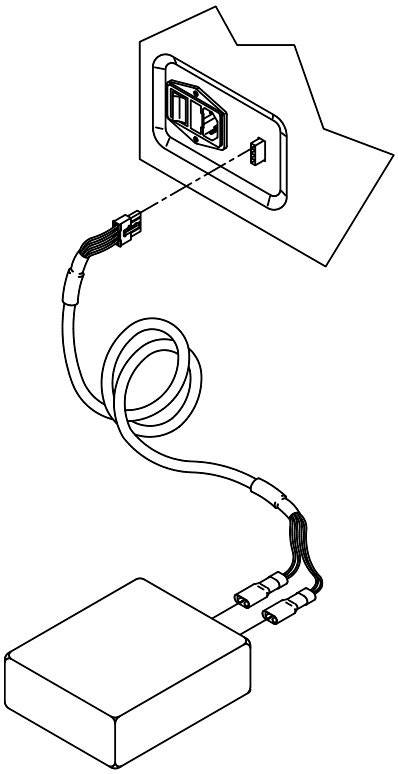

ADS300
40V IS
48V
48V
M 48V AUX.
40 V / 0.7 A remote power supply of S0 bus (LS1 or LD4 cards)
Control of 40 V (for OCT2 only)
Dry contact: when closed indicates absence of mains supply
-48 V auxiliary output for remote power supply of digital telephones for OCT3B card

Description of the LEDs on the front panel of the ADS300

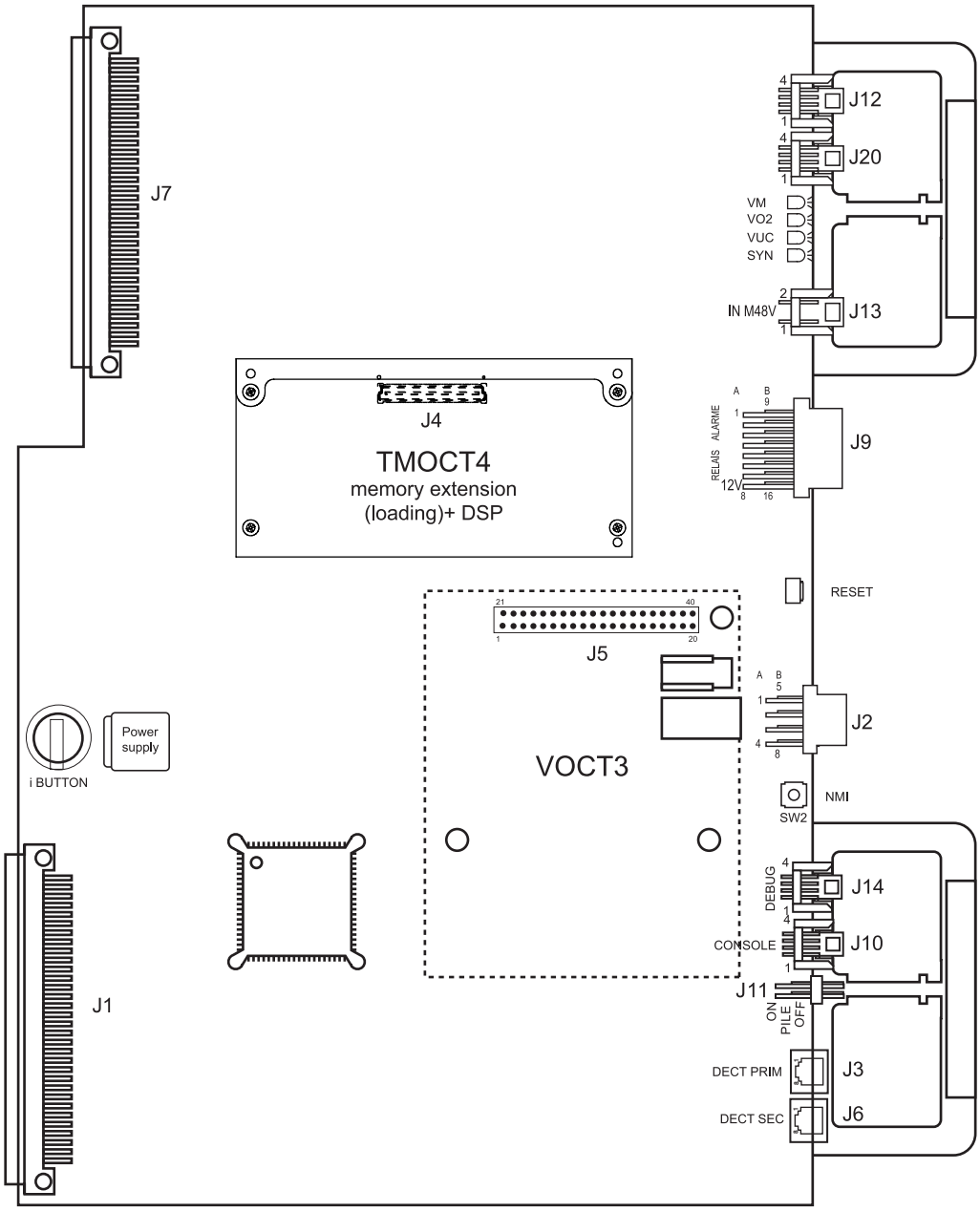

ADS300
40V IS
48V
48V
M 48V AUX.
Led verte : allumée confirme le fonctionnement du générateur d'appel
Led jaune : allumée informe de la présence du secteur.
Led jaune : allumée confirme le fonctionnement de l'étage redresseur.
Led verte : allumée confirme le fonctionnement de l'étage convertisseur.
Led rouge : allumée informe de la présence batterie.

Description of the ADS300 connections

The diagram below shows how to connect an external battery to the ADS300. To this end, a factory-pre-wired cord is supplied with the ADS300.



OCT4 (HJ4444A)



Description of the card

The OCT4 card is the central unit of the M6501L/R IP PBX and is managed in release R2.1 (V14.2) and later.

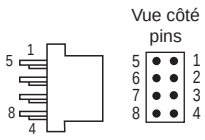
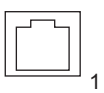
The OCT4 card requires a PTGBUS card (HJ4238AB02) to be installed. This card controls priority on the system bus and is pre-installed at the factory on the cabinet backplane.

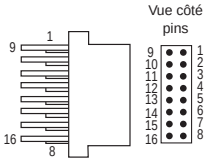
The following changes have been made compared to the OCT3B card:

- 133 MHz AMD Elan SC520 (ASPEN) processor in place of a 33 MHz 386EX
- 12 Mb Flash memory on 32 bits, downloadable by the BOF card (downloading on 16 bits)
- 16 Mb DRAM memory on 32 bits
- 1.5 MB SRAM memory
- DECT synchro:
  - primary port and secondary port with synchronising clock at 2.048 MHz
  - continuity between primary and secondary ports provided, cabinet powered down by a relay
  - cable length compensation by software
  - CT2 synchro removed
  - RJ45 connectors for primary and secondary ports
- configuration switches removed
- optional TMOCT4 daughter card (memory expansion and additional processor) to replace TOCT3 and MOCT3 daughter cards
- iButton removable software dongle

Description of the connectors

The table below describes the connectors on the OCT4 card:

NAME	Function	Description of the contacts
J2 	Used to connect a printer and external music-on-hold.	(see the description of the J2 connector)
J3 and J6 	Connection for the DECT synchronisation signal (primary and secondary)	See description of J3 and J6 connectors (see the DECT installation manual for information about base station synchronisation wiring)
- Folio 1 de 2 -		

NAME	Function	Description of the contacts
J4	Position of the TMOCT4 card.	
J5	Location of the VOCT3 card.	
J9 	Alarm input connections and dry relay contact locations.	(see the description of the J9 connector)
J10	Used to connect a VT100 console or PC emulating a VT100.	pin 1: TXD2 pin 2: RXD2 pin 3: GND pin 4: not connected
J12 and J20	Used to connect four digital sets (2 sets per connector).	J12: pins 4 and 3, extension 0 J12: pins 2 and 1, extension 1 J20: pins 4 and 3, extension 2 J20: pins 2 and 1, extension 3
J13	48 V power supply connection for OCT4 card digital equipment.	pin 2: (+)48 V (of the ADS300 power supply module) pin 1: (-)48 V
J14	Debug serial port.	Factory reserved. Can be connected with a VT100 100 console cable.
- Folio 2 de 2 -		

J2 connector

Used to connect an external music-on-hold source and an SMDR printer.

Contact	Textual specification	Contact	Textual specification
5	ETM (music)	1	GND (music)
6	MUSA (music)	2	GND (music)
7	DTR (printer)	3	GND (printer)
8	TXD (printer)	4	RXD (printer)

J3 connector

DECT primary synchronisation port.

Contact	Textual specification		Contact	Textual specification	
1	AHGA	Clock out of range alarm	5	HDECT1+	DECT synchro
2	AHGB	not used	6	HDECT1-	
3	HBIT1+	2.048MHz bit clock	7	HEXTA	not used
4	HBIT1-		8	HEXTB	

J6 connector

DECT secondary synchronisation port.

Contact	Textual specification		Contact	Textual specification	
1	AHGA	Clock out of range alarm	5	HDECT2+	DECT synchro
2	AHGB	not used	6	HDECT2-	
3	HBIT2+	2.048 MHz bit clock	7	HEXTA	not used
4	HBIT2-		8	HEXTB	

J9 connector

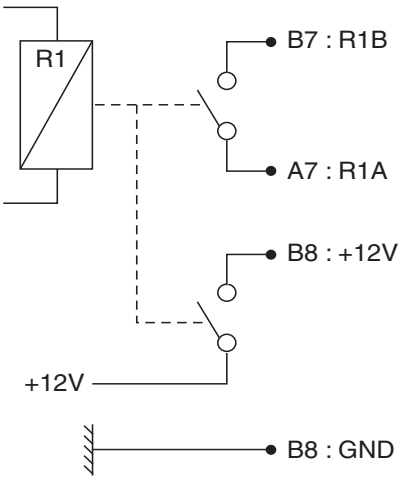
This connector has four alarm input pins (AL0 to AL3) and four control relays (R1 to R4).

Contact	Textual specification	Contact	Textual specification
9	AL2 (alarm input 2)	1	AL3 (alarm input 3)
10	AL0 (alarm input 0)	2	AL1 (alarm input 1)
11	R2C (break contact of the K2 relay)	3	GND
12	R4A (make contact of the K4 relay)	4	R4B (make contact of the K4 relay)
13	R3A (make contact of the K3 relay)	5	R3B (make contact of the K3 relay)
14	R2A (make contact of the K2 relay)	6	R2B (make contact of the K2 relay)
15	R1A (make contact of the K1 relay)	7	R1B (make contact of the K1 relay)
16	12 V	8	GND

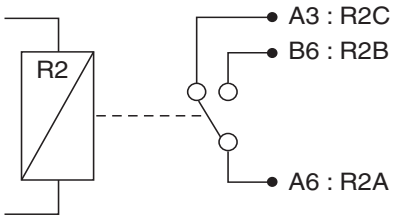
Description of the relays

The following diagrams show the relays R1, R2, R3, and R4 on the OCT4 card.

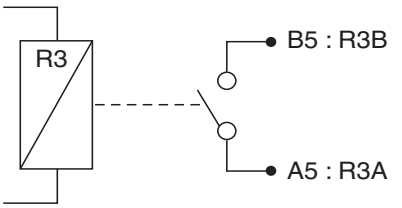
R1: Switching relay



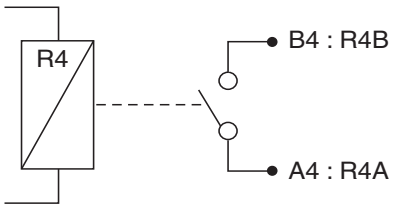
R2: Impaired operation alarm relay



R3: Restricted service relay used when connecting a common bell



R4: Watchdog alarm relay



SW1: RESET, manual initialisation.

SW2: NMI, reserved for factory tests.

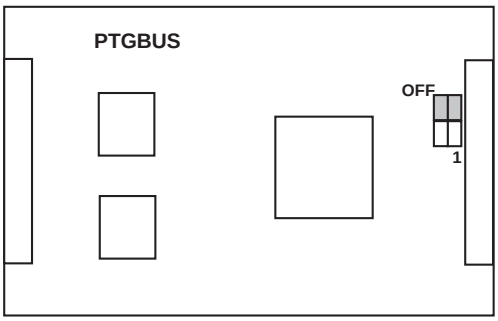
J11: This switch is used to turn the internal data backup battery on and off.

- OFF: battery off
- ON: battery on **(factory setting)**

Description of lights

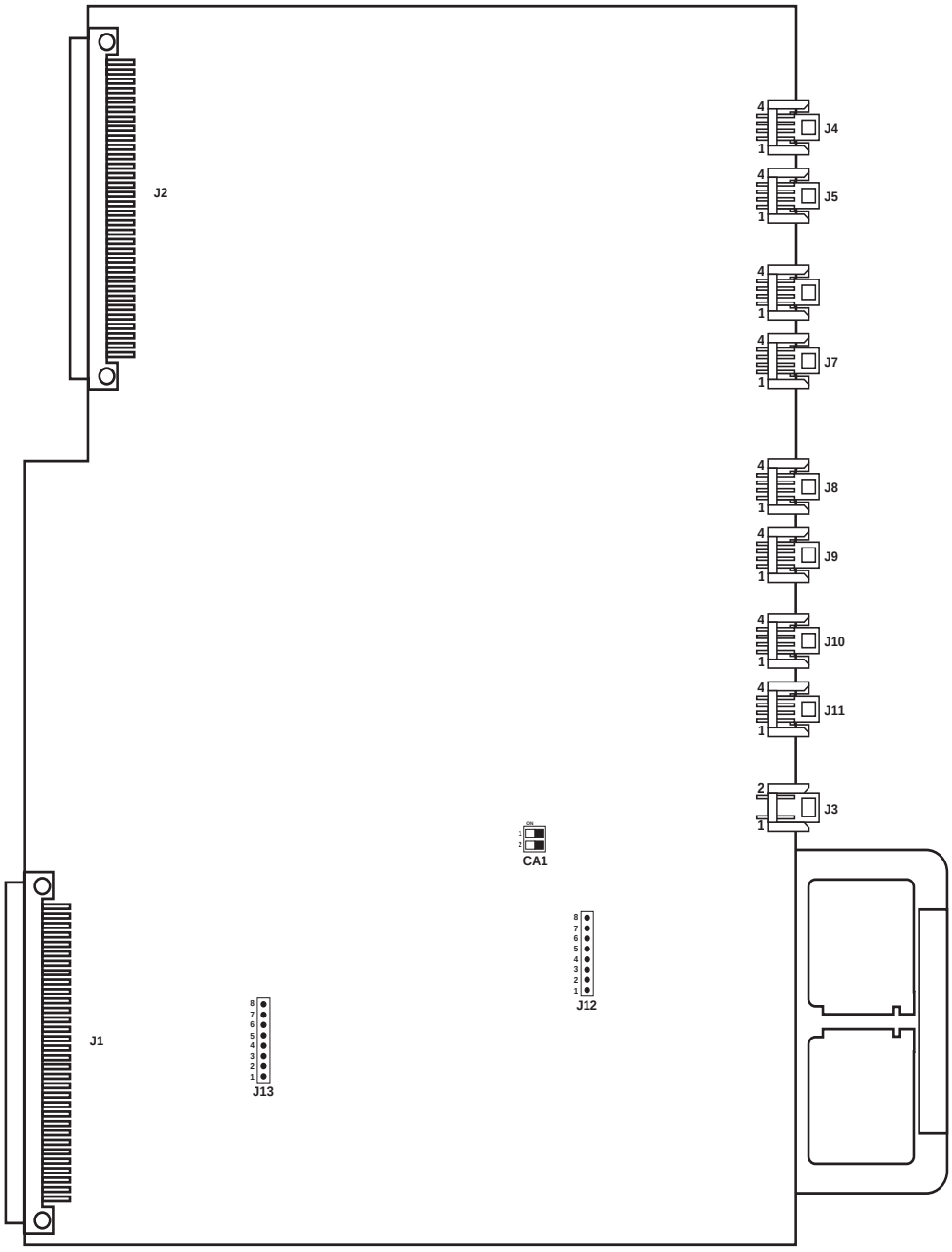
Light	Function
VM	On steady
VO2	On steady
VUC	Flashes if the card is functioning correctly
SYNC	Flashes while receiving a clock signal from the network

Description of PTGBUS card switches



Switch	Position
1	OFF
2	OFF

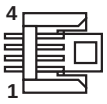
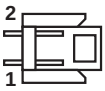
ROCT3B (HJ3990C)



Description of the card

This card is only fitted in the expansion cabinet; it enables the connection of up to 16 digital sets.

Description of the connectors

NAME	Function	Description of the contacts
J4 to J11 	Connecting digital sets	J4: pins 4 and 3: eqpt num. 0 J4: pins 2 and 1: eqpt num. 1 To J11: pins 4 and 3: eqpt num. 14 J11: pins 2 and 1: eqpt num. 15
J3 	48 V power supply connection for digital equipment	pin 2: (+) 48 V pin 1: (-) 48 V

Description of the switches

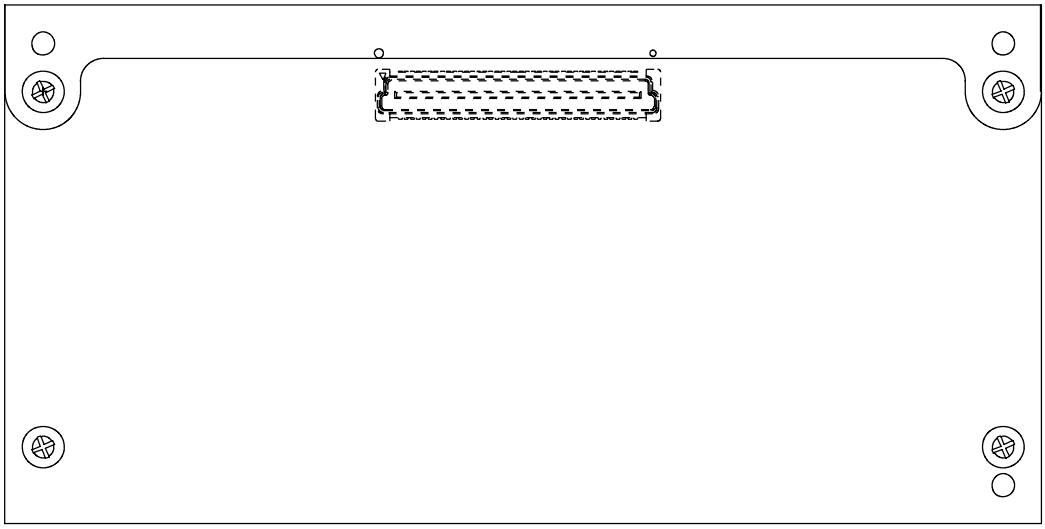
CA1: this switch sets the call charging frequency to 12kHz or 16 kHz.

CA1	Switch CA1	Charging frequency
ON	CA1	16 kHz
OFF	CA1	12 kHz

Description of lights

NAME	Color	Status	Function
CR	red	Flashing	the card is functioning correctly
		On steady	the card is not connected to the OCT4 card

TMOCT4 (HJ4459 A or B)



Description of the card

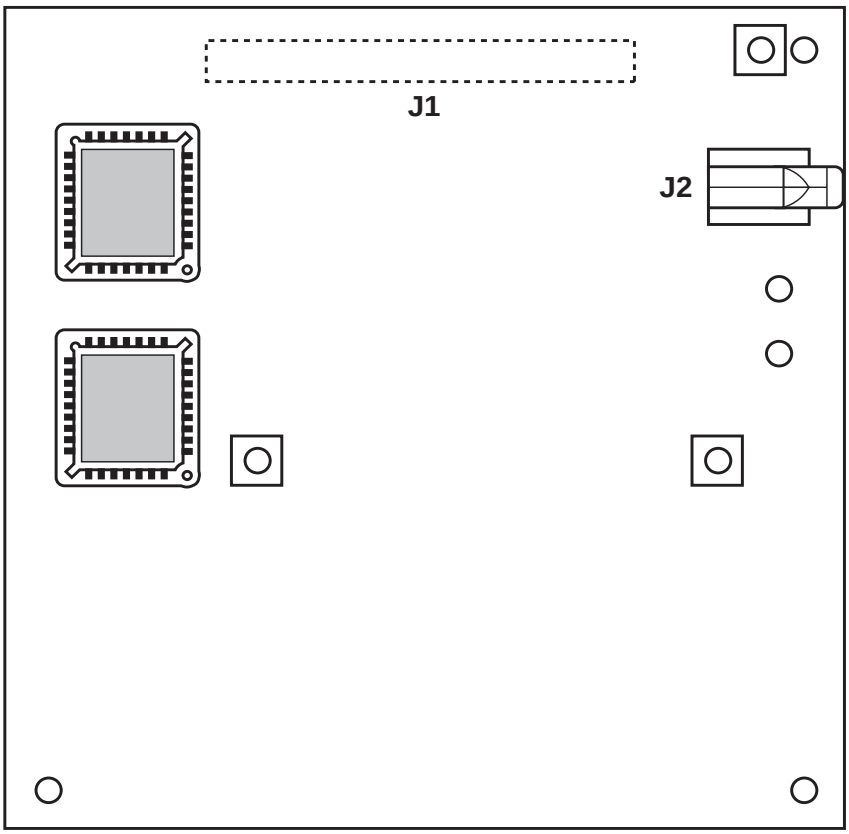
The TMOCT4 card is an optional daughter card of the OCT4 card. There are two versions:

- version A: memory expansion (8 Mb of Flash memory) and additional signal processor (TMS 320LC206), identical to the signal processor fitted on the OCT4 card.
- version B: additional signal processor (TMS 320LC206), identical to the signal processor fitted on the OCT4 card.

This card replaces the MOCT3 and TOCT3 cards fitted on the OCT3B card.

It connects to the J4 connector on the OCT4 card.

VOCT3 (HJ4043A)



Description of the card

This card enables the addition of a PROM containing stored music-on-hold and a PROM with eight spoken announcements each lasting eight seconds. A RAM chip can also be used to record a 64-second customised message.

Description of the connectors

J2: female jack used to connect a microphone and record a message to RAM.

Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

Description of the PROMs

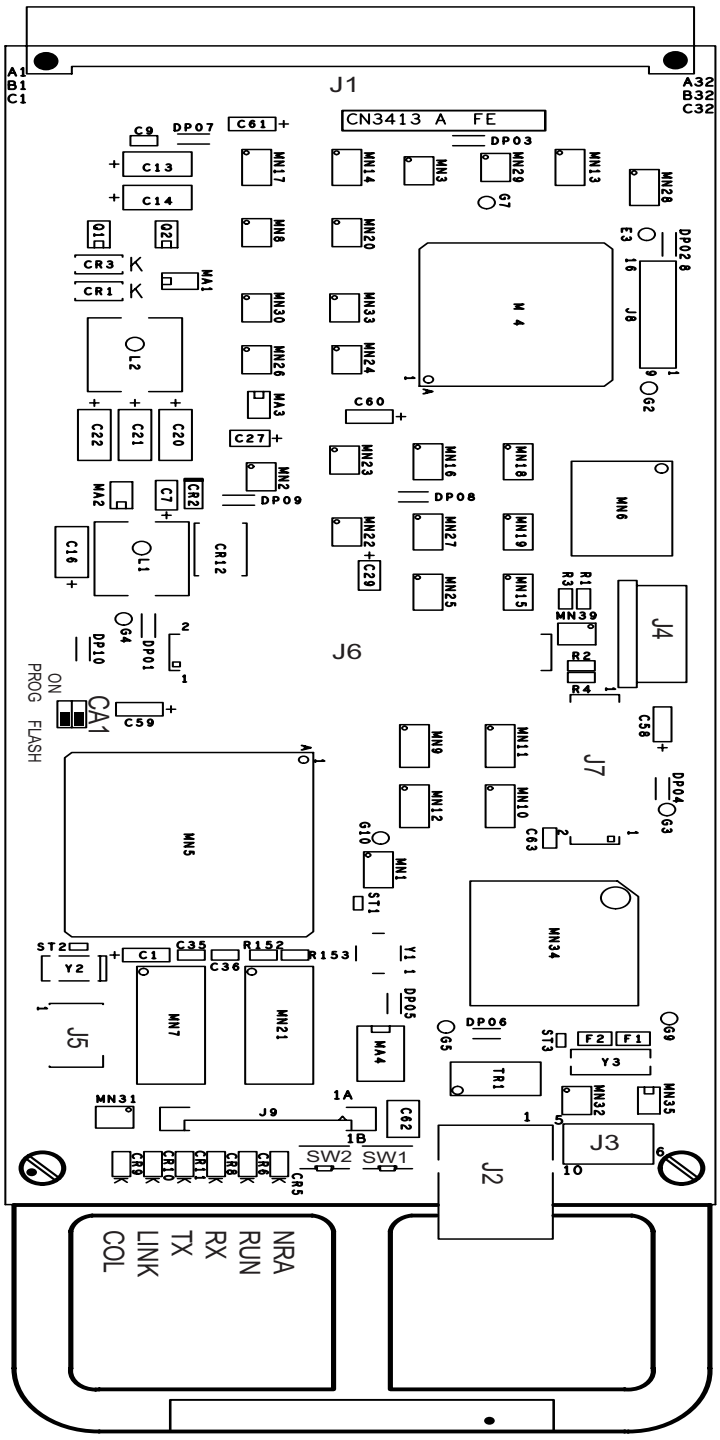
The PROMs contain:

- music-on-hold by Vivaldi
- eight spoken announcements each lasting eight seconds

These eight announcements are:

Message 1, Message left: *A message has been left for you, please check your mailbox.*
Message 2, Congestion: *Due to overflow we cannot connect your call*
Message 3, Operation accepted: *Your request is registered. You can hang up.*
Message 4, Wake-up: *You are called back as requested. Have a nice day.*
Message 5, Confidential code: *Please dial your password.*
Message 6, Credit almost exhausted: *Caution! Please renew you telephone credit. However, you may proceed with your call".*
Message 7, No credit left: *Your telephone credit has run out. You cannot make further calls without renewing it.*
Message 8, Number not used: *The number you have dialled does not exist or is temporarily unavailable. Please check in your directory.*

PT2 (HJ4243A)



Description of the card

The PT2 card is a CLX expansion card. It uses an ASPEN microcontroller operating at 133 MHz.

The PT2 card provides three functions:

- a gateway function between an Ethernet LAN and the X.25 switch in the PBX (TCP/IP-X25)
- the tunnelling function, allowing the PBX to use an IP network to carry the MC6500 IP PBX signalling channel and X.25 communications
- the Voice over IP (VoIP) gateway function, which uses the VOIP4(E)-8, VOIP4(E)-16, or VOIP4(E)-32 daughter card to manage 8, 16, or 32 Voice over IP circuits.

The PT2 card is connected to an Ethernet controller. An RJ45 connector can be used to connect a LAN port compatible with the 10 Base T or 100 Base TX standards and compliant with IEEE specification 802.3.

A multi-site link cannot mix a VOIP4/VOIP4E (HotHaus) card in conjunction with a VOIP2 (Audiocodes) card.

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Consumption at the +5V terminal should be checked to ensure proper operation.

Estimated consumption:

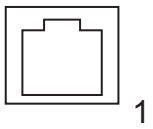
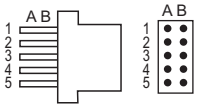
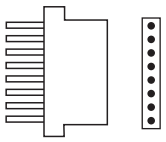
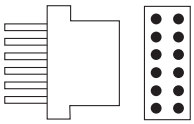
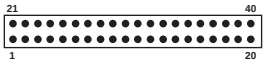
PT2 only: 800 mA

PT2 + VOIP4(E)-8: 1,03 mA

PT2 + VOIP4(E)-16: 1,25 mA

PT2 + VOIP4(E)-32: 1,5 mA

Description of the connectors

NAME	Function	Description of the contacts
J2 	RJ45 connector: Connection to the IEEE 802.3 LAN	1- TPTX+ 2- TPTX- 3- TPRX+ 4- NC. 5- NC. 6- TPRX- 7- NC. 8- NC.
J3 	HE14 2X5 pin connector. Used to connect a VT100 console or PC (debug).	Not used
J4 	HE14 1x8 pin connector. "In situ" programmable component loading.	Not used
J5 	HE14 2 x 6-pin connector. Used to connect a JTAG emulator.	Not used
J6 and J7 	2x40 pin and 2x20 pin connectors. Location of the VOIP4 or VOIP4E daughter card.	Not used

Description of the switches

The CA1 double switch enables the flash memory to be programmed using the BOF3 tool card:

OFF: Normal mode (factory setting)

ON: Programming mode

Pushbuttons:

SW1: Reset

SW2: NMI (Non-maskable interrupt)

Description of lights

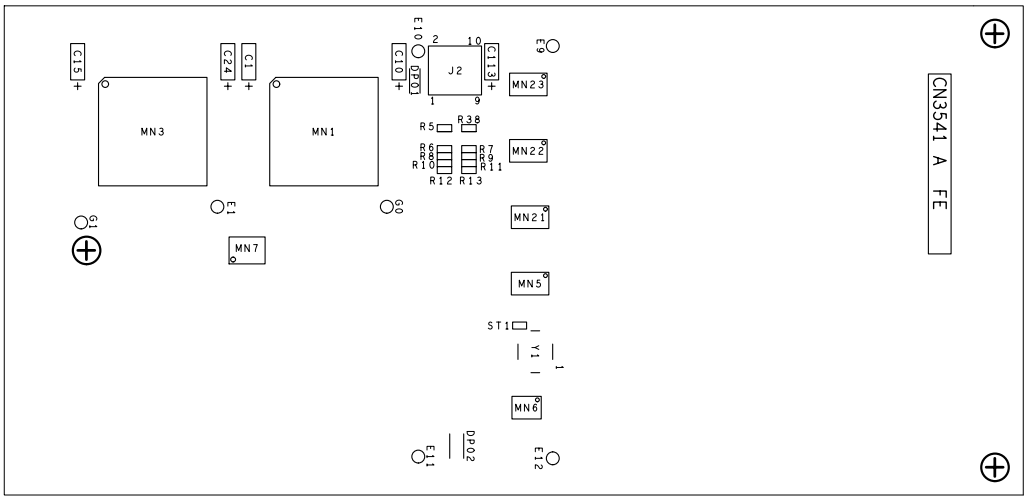
The six LEDs described in the table below show the operating status of the PT2 card:

NAME	Color	Status	Function
COL	Green	On	Ethernet collision
LINK	Green	On	Link to the Ethernet switch
TX	Green	On	Transmission to LAN
RX	Green	On	Reception from LAN
RUN	Green	Card loading	
		flashing slowly	During loading
		flashing quickly	Busy
NRA	red	On	Fault warning

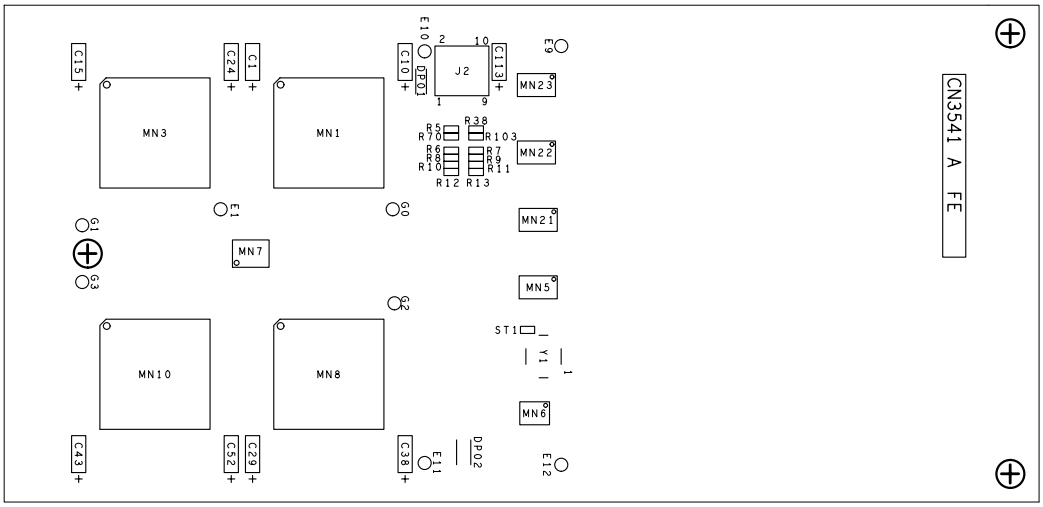
VOIP4/VOIP4E

There are six different PT2 daughter card variants: VOIP4 8-channel, 16-channel, and 32-channel and VOIP4E 8-channel, 16-channel, and 32-channel. The VOIP4E card is an upgraded VOIP4 card, with improved echo cancellation management.

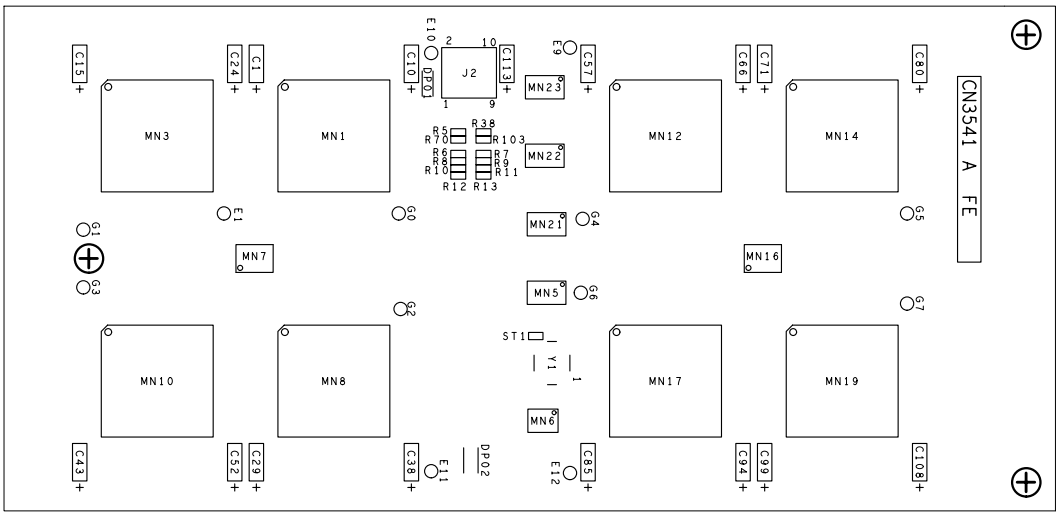
VOIP4-8 (HJ4256F) **VOIP4E-8** (HJ4449C)



VOIP4-16 (HJ4256E) **VOIP4E-16** (HJ4449B)



VOIP4-32 (HJ4256D **VOIP4E-32** (HJ4449A))

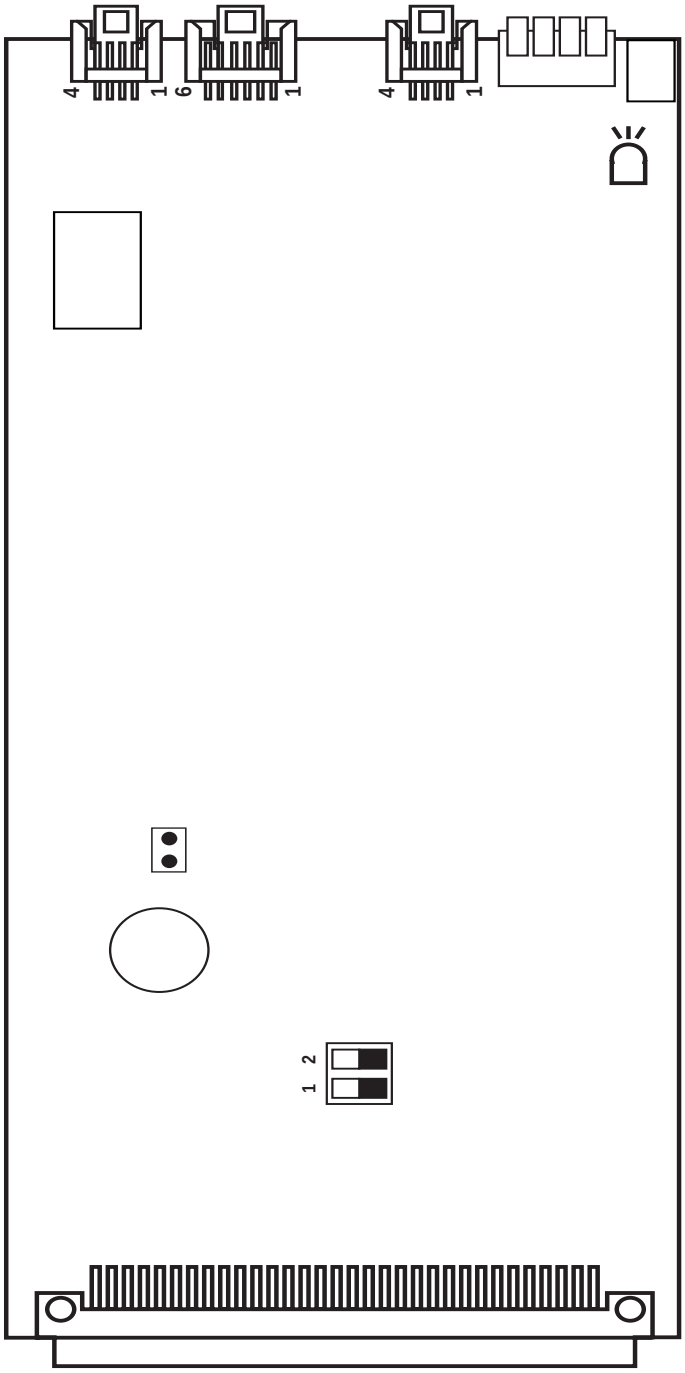


Description of the card

The VOIP4/VOIP4E card is used to manage voice over IP circuits.

This card uses the J6 and J7 connectors on the PT2 card.

BTX (HJ4190A)



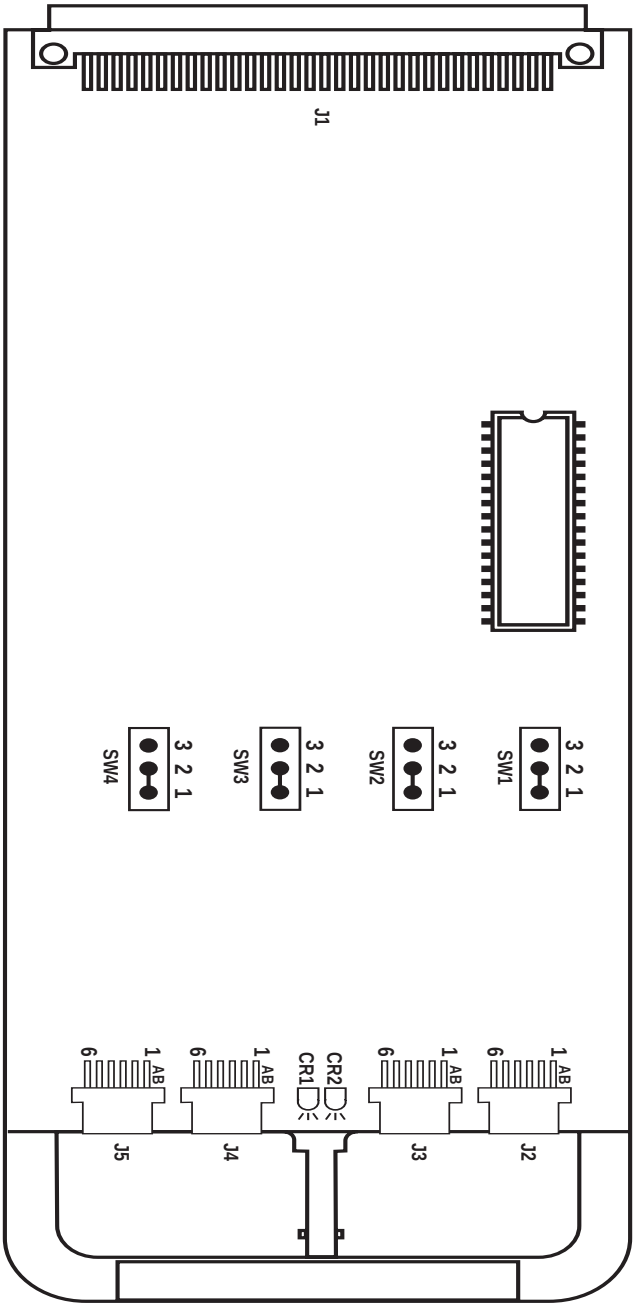
Description of the card

The BTX card is a 4000 record call charging buffer card.

This card is described in a separate document supplied with the card.

Please refer to the instructions supplied with the card for more information.

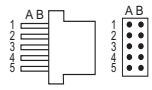
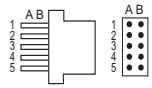
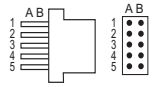
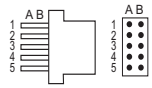
CA1 (HJ2678A)



Description of the card

This card enables four V24 asynchronous terminals to be connected in V28 or V10 mode.

Description of the connectors

NAME	Function	Description of the contacts
J2 	Used to connect equipment 0	See connectors J2, J3, J4, and J5
J3 	Used to connect equipment 1	
J4 	Used to connect equipment 2	
J5 	Used to connect equipment 3	

Connectors J2, J3, J4, and J5: the contacts on these connectors are described in the table below:

Contact	Function	Contact	Function
A1	TD (transmitted data)	B1	not wired
A2	RD (received data)	B2	not wired
A3	DTR (Data Terminal Ready output)	B3	RTS (flow control output)
A4	CTS (flow control input)	B4	CD (data terminal input)
A5	GND (0 V return for junction outputs)	B5	RET (0V return for junction input, with V10)

Description of the switches

Switches SW1, SW2, SW3, and SW4 are used to set V10 or V28 mode.

Equipment number	Connector	Switch	V10 mode	V28 mode
0	J2	SW1		
1	J3	SW2		
2	J4	SW3		
3	J5	SW4		

Description of lights

NAME	Color	Status	Function
CR1	Red	On steady	incorrect operation
CR2	Red	Rapid blink	card in service

List of circuits for the V24 junction on the CA1 card

DTE (Data terminal equipment):

Circuit number	Identification		ETTD		Direction Transmission	Description of the CA1 card connector
	CCITT	EIA	9 pins	25 pins		
104	RD	RD	2	3	--->	**A1** Received data
103	ED	ST/TD	3	2	<---	**A2** Transmitted data
109	DS/DP	CD	1-6	6-8	--->	**A3** Data terminal input
105	DPE	RTS	7	4	<---	**A4** flow control output
102	TS	GND	5	7	<---	**A5** 0 V return for junction output
						B1 not wired
						B2 not wired
106	PAE	CTS	8	5	--->	**B3** flow control input
108	TDP	DTR	4	20	<---	**B4** data terminal ready output
			5	7		**B5** 0V return for V10 junction input

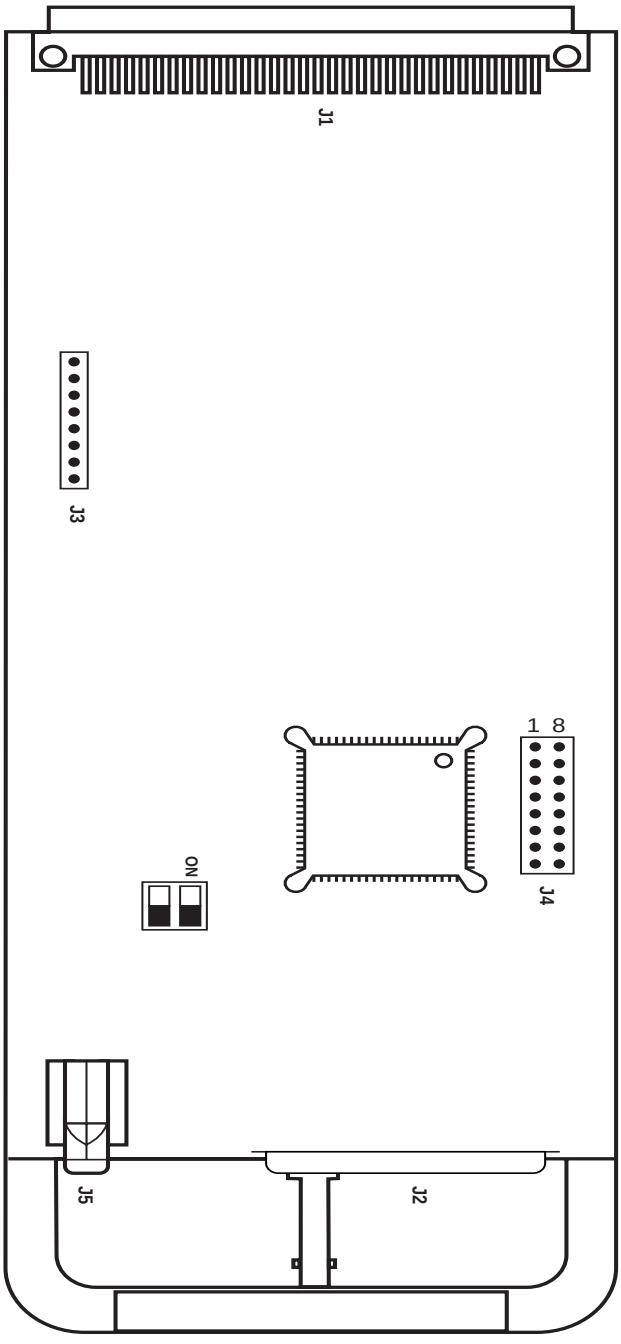
Note: *Circuit 107 "Data set ready" (DSR) is not present on the CA1 card. The straps are not shown in this table.*

DCE (Data circuit terminal equipment):

Circuit number	Identification		DCE		Direction Transmission	Description of the CA1 card connector
	CCITT	EIA	9 pins	25 pins		
104	RD	RD	2	3	<---	**A1** received data
103	ED	ST/TD	3	2	--->	**A2** transmitted data
109	DS/DP	CD	1	8	<---	**B4** data terminal input
105	DPE	RTS	7	4	--->	**B3**flow control output
102	TS	GND	5	7	--->	**A5** 0 V return for junction output
						B1 not wired
						B2 not wired
106	PAE	CTS	8	5	<---	**A4** flow control input
108	TDP	DTR	4	20	--->	**A3** data terminal ready output
			5	7		**B5** 0 V return for V10 junction input

Note: *Circuit 107 "Data set ready" (DSR) is not present on the CA1 card. The straps are not shown in this table.*

CC1 (HJ4069D)

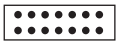


Description of the card

The CC1 card can be used to record, play, and manage synchronised messages.

It is used to manage 64 different spoken announcements, each lasting between 1 second and 16 minutes.

Description of the connectors

NAME	Function
J2	Connection to the PC parallel port
J3	Not fitted
J4 	Not fitted
J5	Tape recorder connection

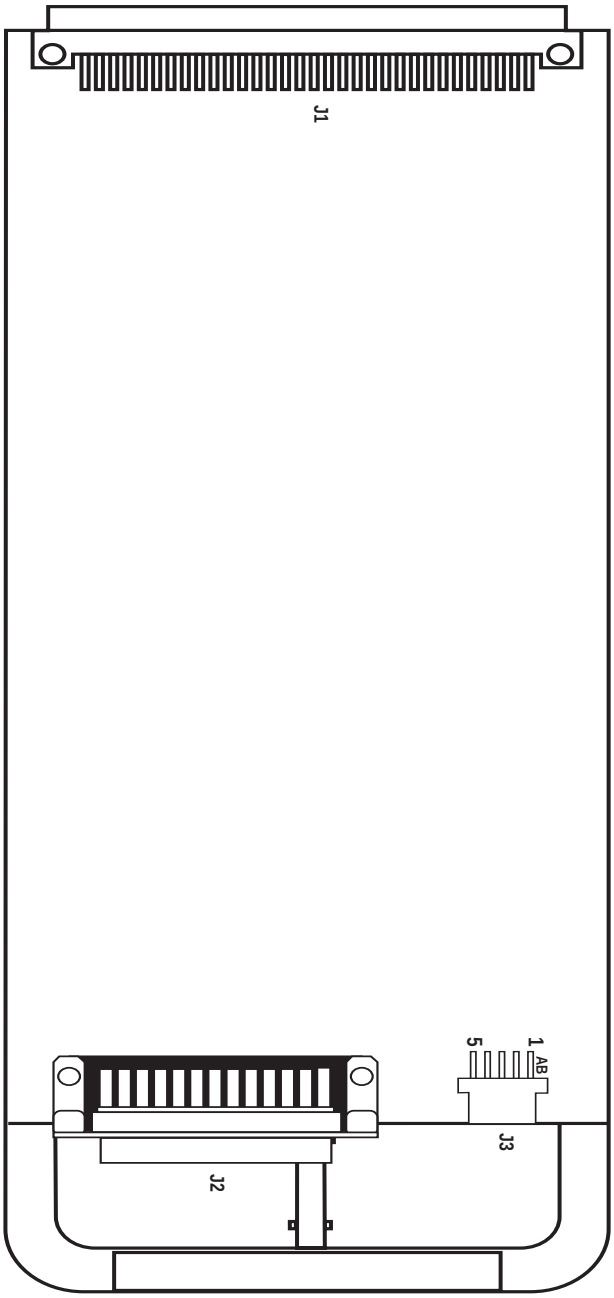
Description of the switches

There are no switches on this card.

Description of lights

NAME	Color	Status	Function
FCT	Green	flashing	in service or disabled during the recording phase
		on steady	disabled while not in the recording phase
REC	Green	off	in service or disabled while not in the recording phase
		on steady	disabled during the recording phase

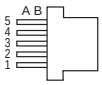
CHP1 (HJ3636B)



Description of the card

This card is a tool card used to load software and enable a PC parallel port connection.

Description of the connectors

NAME	Function
J2	Connection to the PC parallel port
J3 	Reserved for factory testing

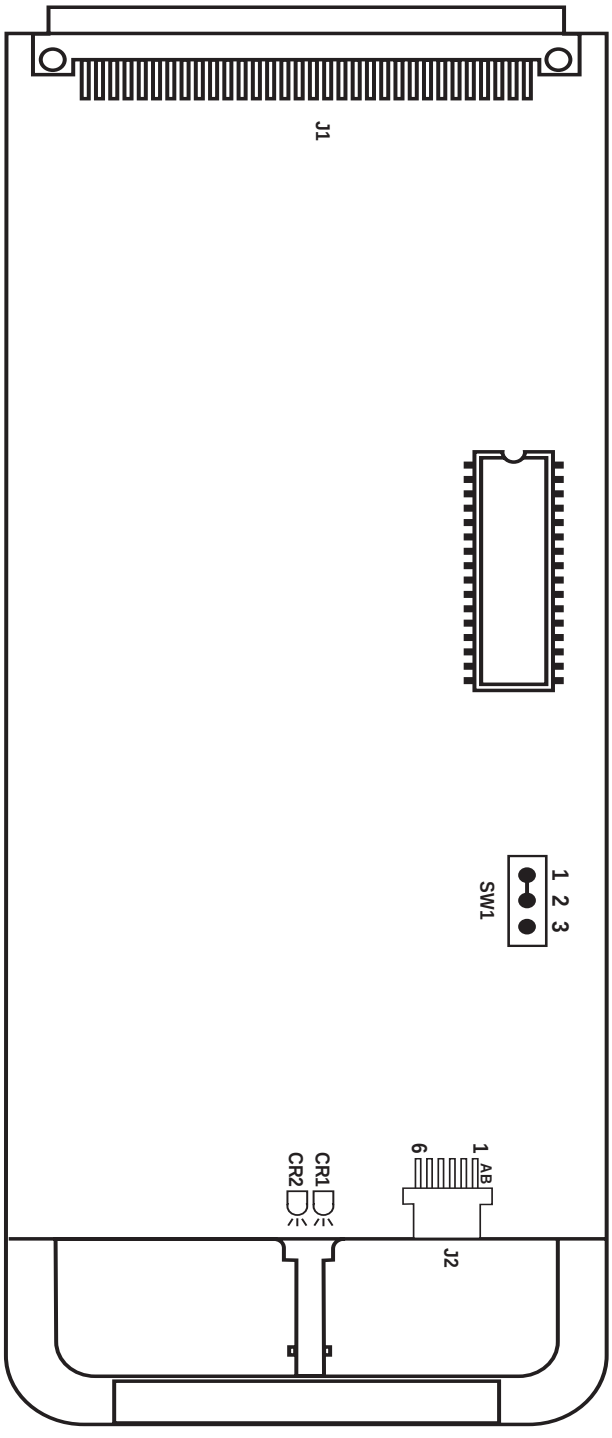
Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card

CP1 (HJ2706A)



Description of the card

This card enables data to be sent in packet mode on the B channel in an ISDN link.

Description of the connectors

J2: connector reserved for factory testing.

This card has no external connections.

Description of the switches

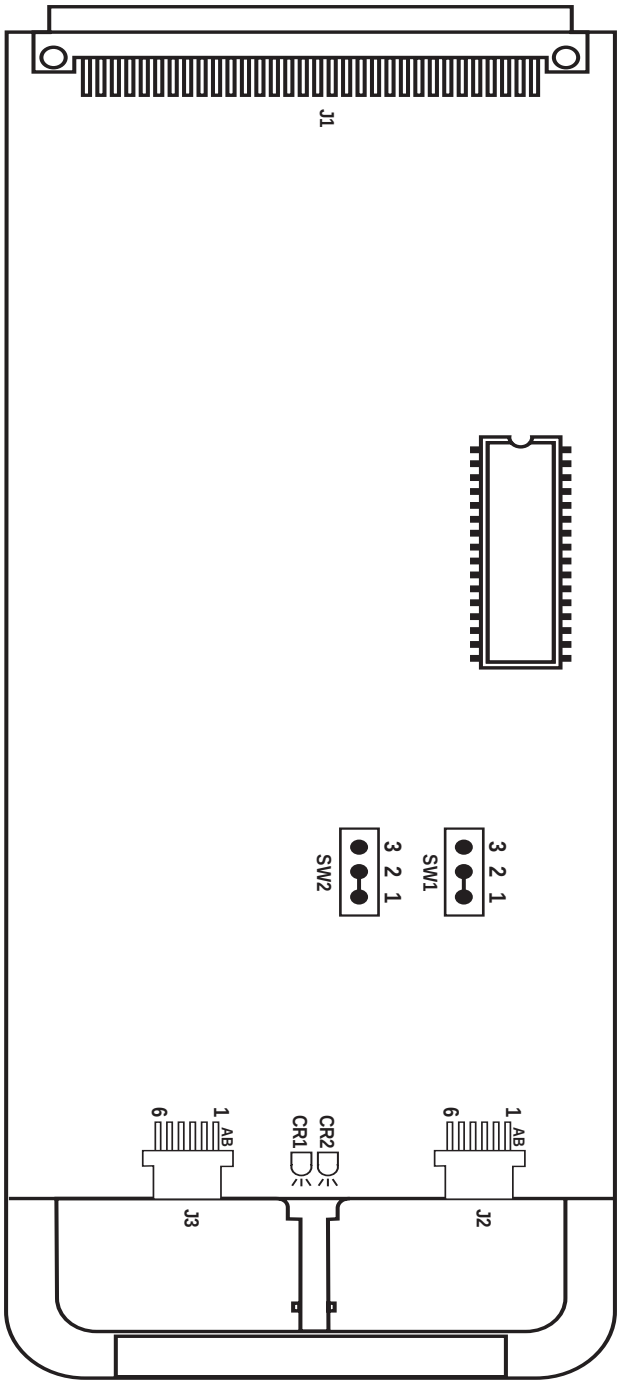
SW1: jumper switch reserved for factory testing. The default position is 1-2.

SW2: this jumper switch selects V10 mode (position 1-2) or V28 (pos. 2-3).

Description of lights

NAME	Status	Function
CR1	on steady	incorrect operation
CR2	flashing	card in service

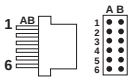
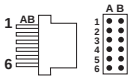
CS1 (HJ2696A)



Description of the card

This card enables two X.25 synchronous interfaces to be connected in V28 or V10 mode.

Description of the connectors

NAME	Function	Description of the contacts
J2 	Used to connect equipment 0	See J2 and J3 connectors
J3 	Used to connect equipment 1	

J2 and J3 connectors: the contacts on these connectors are described in the table below.

Contact	Function	Contact	Function
A1	TD (Transmitted data)	B1	XTC (Clock signal sent)
A2	RD (Received data)	B2	Not wired
A3	DTR (Data Terminal Ready output)	B3	RTS (Flow control output)
A4	CTS (Flow control input)	B4	CD (Data terminal input)
A5	GND (0 V return for junction outputs)	B5	RET (0V return for junction input, with V10)
A6	CR (Clock received for received data)	B6	TC (Clock received for transmitted data)

Description of the switches

SW1 and **SW2:** these switches are used to select V10 or V28 mode (see table below).

Equipment number	Connector	Switch	V10 mode	V28 mode
0	J2	SW1		
1	J3	SW2		

Description of lights

NAME	Color	Status	Function
CR1	Red	on steady	incorrect operation
CR2	Red	flashing	card in service

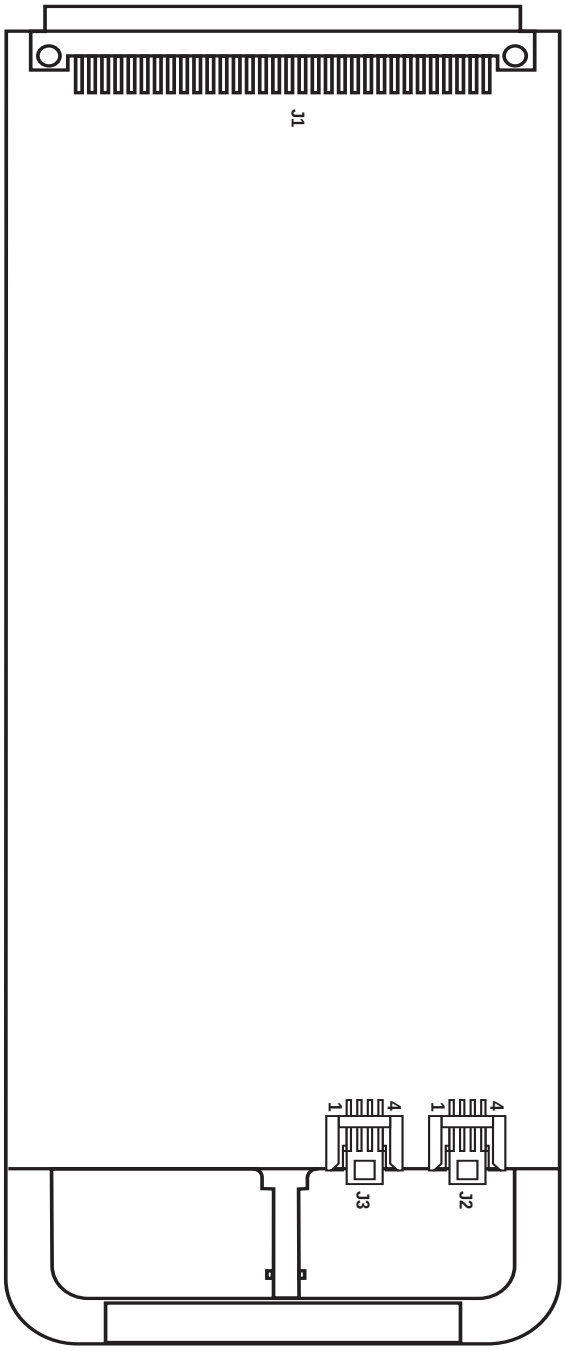
List of circuits for the X.25 junction on the CS1 card

DTE (Data terminal equipment):

Circuit number	Identification		ETTD	Direction Transmission	Description of the CS1 card connector
	CCITT	EIA	25 pins		
104	RD	RD	3	<---	**A1** received data
103	ED	ST/TD	2	--->	**A2** transmitted data
109	DS/DP	CD	6-8	<---	**A3** data terminal input
105	DPE	RTS	4	<---	**A4** flow control output
102	TS	GND	7	--->	**A5** 0 V return for junction output
113		XTC	24	--->	**A6** transmitted clock
114	HEM	TC	15	--->	**B1** clock received for transmitted data
					B2 Not wired
106	PAE	CTS	5	--->	**B3** flow control input
108	TDP	DTR	20	<---	**B4** data terminal ready output
			7		**B5** 0 V return for V10 junction input
115	HRM	CR	15-17	--->	**B6** clock received for received data

Circuit number	Identification		DCE	Direction Transmission	Description of the CS1 card connector
	CCITT	EIA	25 pins		
104	RD	RD	3	<---	**A2** received data
103	ED	ST/TD	2	--->	**A1** transmitted data
109	DS/DP	CD	8	<---	**B4** data terminal input
105	DPE	RTS	4	--->	**B3**flow control output
102	TS	GND	7	--->	**A5** 0 V return for junction outputs
113		XTC	24	--->	**B1** transmitted clock
114	HEM	TC	15	<---	**B6** clock received for transmitted data
					B2 not wired
106	PAE	CTS	5	<---	**A4** flow control input
108	TDP	DTR	20	--->	**A3** data terminal ready output
			7		**B5** 0 V return for V10 junction input
115	HRM	CR	17	<---	**A6**clock received for received data

LA4 (HJ2843A)



Description of the card

The LA4 card enables the connection of four Z interface analogue terminals, such as decadic or DTMF sets, answering machines, group 3 fax machines, etc.

Description of the connectors

NAME	Function	Description of the contacts
J2	connector for connecting two analogue sets	pins 4 and 3: analogue set 0 pins 2 and 1: analogue set 1
J3	connector for connecting two analogue sets	pins 4 and 3: analogue set 2 pins 2 and 1: analogue set 3

Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

Line characteristics

Line resistance, including set: 500 Ohms

- 0.4 mm cable: approximately 2 km (maximum distance between set and cabinet)
- 0.6 mm cable: approximately 3.5 km (maximum distance between set and cabinet)

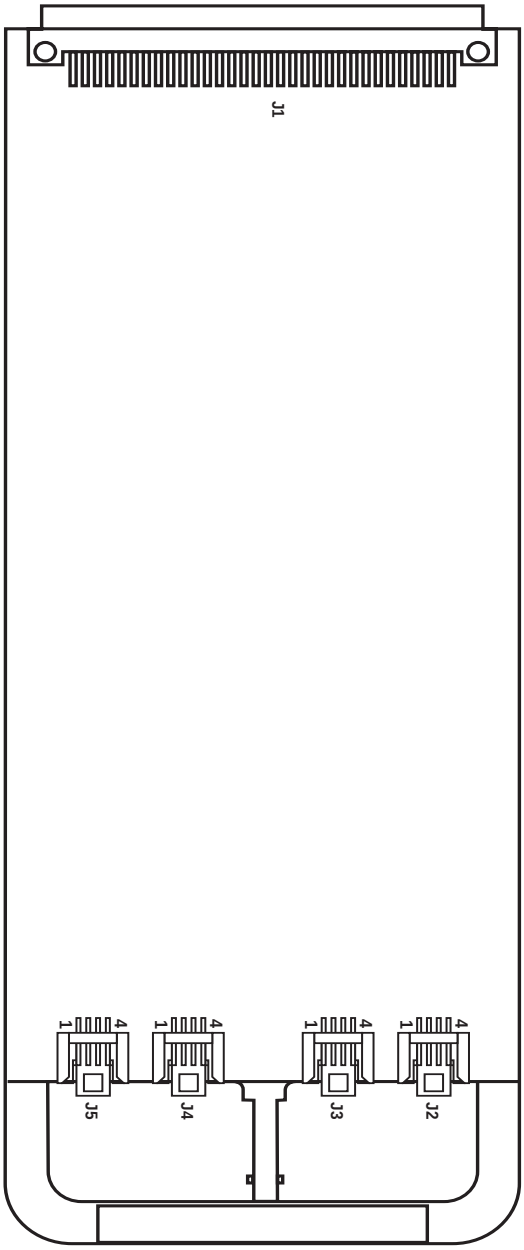
The voltage and current measured at the set terminals during a conversation must be:

- U = 12.4 V / I = 25 mA

All the analogue sets connected to the ICS must be have the following settings:

- Z impedance ref. 2 (complex impedance)
- self-regulating

LA8 (HJ2763B)



Description of the card

The LA8 card enables the connection of eight interface Z analogue terminals, such as decadic or DTMF sets, answering machines, group 3 fax machines, etc.

Description of the connectors

NAME	Function	Description of the contacts
J2	used to connect two analogue sets	pins 4 and 3: analogue set 0 pins 2 and 1: analogue set 1
J3	used to connect two analogue sets	pins 4 and 3: analogue set 2 pins 2 and 1: analogue set 3
J4	used to connect two analogue sets	pins 4 and 3: analogue set 4 pins 2 and 1: analogue set 5
J5	used to connect two analogue sets	pins 4 and 3: analogue set 6 pins 2 and 1: analogue set 7

Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

Line characteristics

Line resistance, including set: 500 Ohms

- 0.4 mm cable: approximately 2 km (maximum distance between set and cabinet)
- 0.6 mm cable: approximately 3.5 km (maximum distance between set and cabinet)

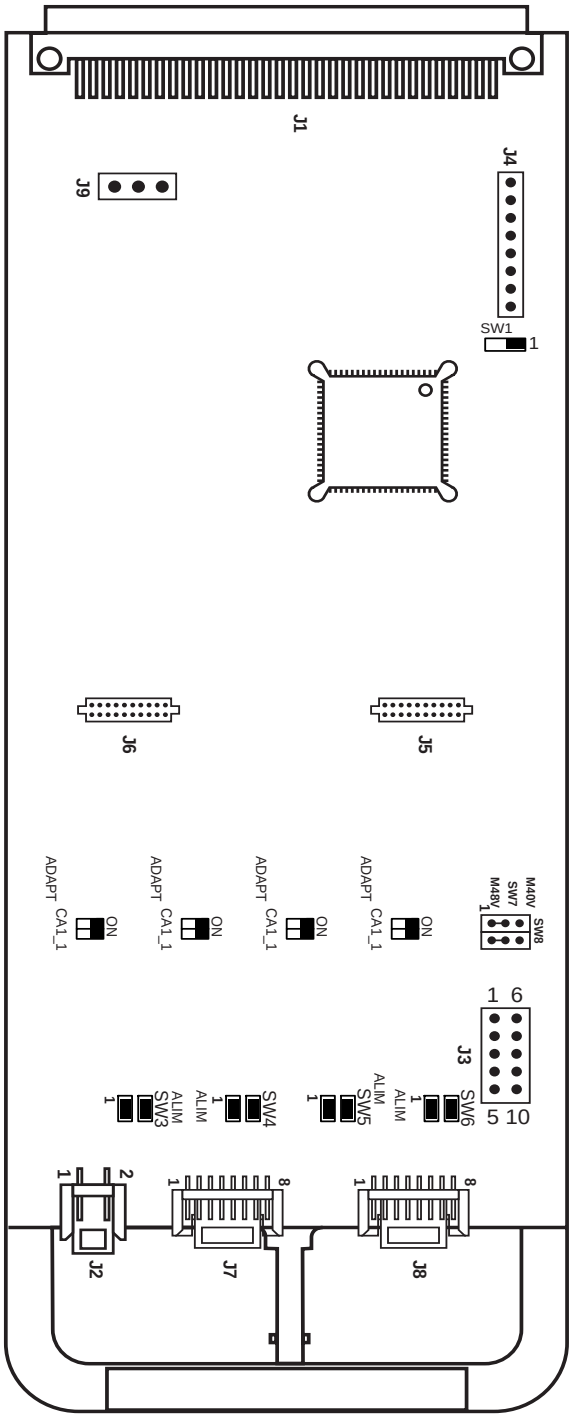
The voltage and current measured at the set terminals must be:

- U = 12.4 V / I = 25 mA

All the analogue sets connected to the PBX must be have the following settings:

- Z impedance ref. 2 (complex impedance)
- self-regulating

LD4 (HJ4054A)


J1
J9
J4
SW1
1
J6
J5
ADAPT CA1_1
ON
M40V
SW7
M48V
SW8
1 6
J3
5 10
ALIM
SW6
SW5
SW4
SW3
J2
J7
J8
1
2
8

Description of the card

The LD4 card has four T0/S0 interfaces and is used to manage 2- or 4-channel DECT base stations.

There are two possible configurations:

Without ADPCM daughter card:

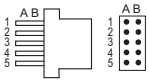
connection to the ISDN network, ISDN terminals or connection of two-channel DECT base stations.

With one (two) ADPCM daughter card(s) or one ADPCM 16 daughter card:

used to connect 4-channel DECT base stations to one to four of its interfaces; the other interfaces can be connected to the ISDN network, ISDN terminals or 2-channel DECT base stations.

Fitted with one or two daughter cards, the LD4 card uses the TSs assigned to 2 slots, hence forbidding equipment sharing the same PCM in the associated slot.

Textual specification of the connectors

NAME	Function
J2	Used to connect the 40 V remote power supply on ISDN terminals
J3 	Factory reserved.
J4	Factory reserved
J5 and J6	Used to connect the ADPCM daughter cards or the ADPCM 16 daughter card
J7	Used to connect two T0/S0 interfaces Interface 0: Pin 5: ED0 Pin 6: NED0 Pin 7: RD0 Pin 8: NRD0 Interface 1: Pin 1: ED1 Pin 2: NED1 Pin 3: RD1 Pin 4: NRD1
J8	Used to connect two T0/S0 interfaces Interface 2: Pin 5: ED2 Pin 6: NED2 Pin 7: RD2 Pin 8: NRD2 Interface 3: Pin 1: ED3 Pin 2: NED3 Pin 3: RD3 Pin 4: NRD3
J9	Not fitted

Description of the switches

CA1.1 to **CA1.4** : these switches are used to adapt lines (factory setting, leave set to ON).

CA2: configure according to the card's location and mode (master/slave).

Case of LD4 in T0 configuration (shelf 0 of the main cabinet only)

CA2.1 (VALH)	Function
ON	CA2.1 is active only in Shelf 0 in the main cabinet (positions 0-5). Set it to ON if the LD4 card is used in T0 mode, to synchronise the PBX clock with the public network clock.
OFF	Set to OFF: - if the LD4 and LD4N cards used in T0 or LT2 are in positions 2 and 4 because they cannot simultaneously transmit the clock ("or" cabled), - if the LD4 and LD4N cards used in T0 or LT2 are in positions 3 and 5 (the PBX has only four clock inputs). These positions 3 and 5 correspond to the priority clock input of the OCT3B or OCT4 CPU.

Case of LD4 in S0 configuration (for DECT BS)

CA2.2 (M/S)	Function
M	LD4 master: **position not allowed with an OCT4 card**
S	to be set in position E on all LD4 cards

SW1: factory reserved; leave in position 1-2.

SW3, **SW4**, **SW5**, and **SW6**: these jumper switches are used to disable each interface's remote power supply when a T0 interface is connected.

SW3	Remote power supply for interface 3
SW4	Remote power supply for interface 2
SW5	Remote power supply for interface 1
SW6	Remote power supply for interface 0

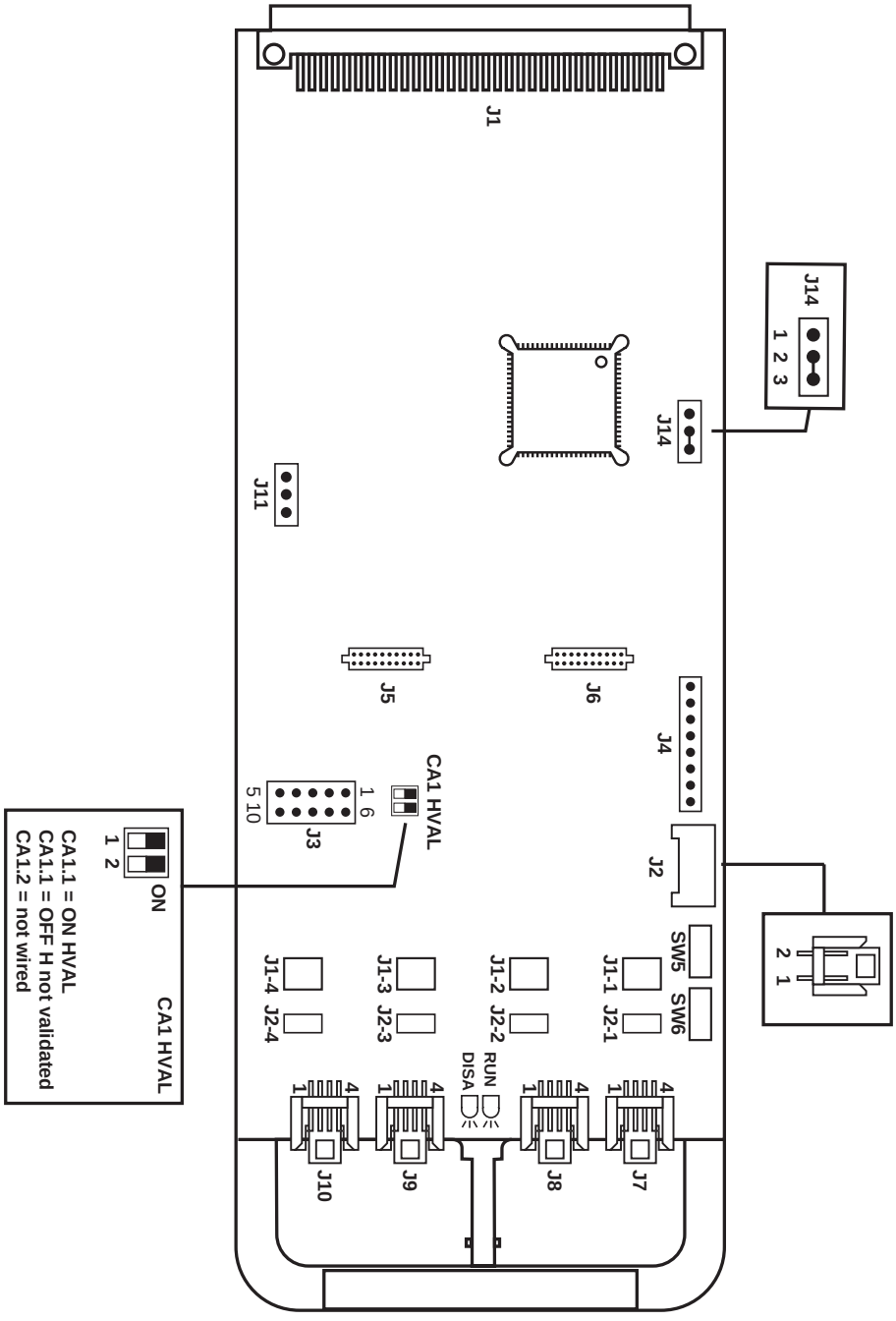
SW7 and **SW8**: these jumper switches are used to set either a 40 V or 48 V remote power supply

SW7 and SW8	Positions	Function
	1-2	Selects the 48 V power supply
	2-3	Selects the 40 V power supply

Description of lights

NAME	Color	Function
CR2	Red	Shows the operating status of the card

LD4N (HJ4734A)



Description of the card

The LD4N card has four T0/S0 interfaces and is used to manage 2- or 4-channel DECT base stations.

There are two possible configurations:

Without ADPCM daughter card:

connection to the ISDN network, ISDN terminals or connection of two-channel DECT base stations.

With one ADPCM 16 daughter card:

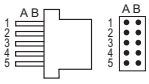
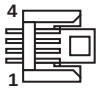
the card is used to connect 4 x 4-channel DECT base stations on 1 to 4 of its interfaces; the other interfaces can be connected to the ISDN network, ISDN terminals or 2-channel DECT base stations

Fitted with a daughter card, the LD4N card uses the TSs assigned to 2 slots, hence forbidding equipment sharing the same PCM in the associated slot.

The LD4N card is used to **manage the M bit channel by channel**: for software releases before 3.2, the 4 equipment interfaces on the LD4N card generate the M bit in the S frame every 800 ms (factory setting). This setting can be changed to 5 ms for particular ISDN applications (video conference, router) if the set of resistors on the card (R91 and R67) are modified. From release 3.2, operation at 5 or 800 ms is determined automatically. The LD4N card has its accesses initialised channel by channel, depending on their configuration:

- DECT M bit S frame: the interface generates the M bit in the S frame to the base station every 800 ms,
- DECT master base station, DECT slave base station or non-DECT S0 terminal: the interface generates the M bit in the S frame to the base station every 5 ms. The slave base station does not use this synchronisation; it uses only the 800ms clock transmitted by the master base station via the third pair

Description of the connectors

Name	Function
J2 	STOCKO male connector, 2 pins Used to connect the 40 V remote power supply on ISDN terminals Pin 1 : M40V Pin 2 : P40V
J3 	HE14 2X5 pin connector Factory reserved
J4 	HE14 8 pin connector Factory reserved
J5, J6 	AMP CMS 2x10 pin connector ADPCM 16 daughter card connection **Caution:** the ADPCM8 daughter card is not managed by the LD4N card
J7 à J10 	Four STOCKO male connectors connection of the S0/T0 interfaces J10 (Interface 3) : Pin 1 : ED3 Pin 2 : NED3 Pin 3 : RD3 Pin 4 : NRD3 J8 (Interface 1) : Pin 1 : ED1 Pin 2 : NED1 Pin 3 : RD1 Pin 4 : NRD1 J9 (Interface 2) : Pin 1 : ED2 Pin 2 : NED2 Pin 3 : RD2 Pin 4 : NRD2 J7 (Interface 0) : Pin 1 : ED0 Pin 2 : NED0 Pin 3 : RD0 Pin 4 : NRD0
J11	Factory reserved

Description of the switches

Micro-switch CA1 (HVAL) is used to configure synchronisation (T0).

Case of LD4N in T0 configuration (shelf 0 of the main cabinet only)

CA1 (HVAL)	Fonction
ON	CA1 is active only in Shelf 0 in the main cabinet (positions 0-5) and if card is used in T0. set it to ON position if the LD4N card is used in T0 mode, to synchronise the PBX clock with the public network clock
OFF	set to OFF: - if the LD4 and LD4N cards used in T0 or LT2 are in positions 2 and 4 because they cannot simultaneously transmit the clock ("or" cabled), - if the LD4 and LD4N cards used in T0 or LT2 are in positions 3 and 5 (the PBX has only four clock inputs). These positions 3 and 5 correspond to the priority clock input of the mother card.

Jumpers J1_1, J1_2, J1_3 and J1_4 are used to enable the remote power supply (40 V or 48V) of each interface where an S0 interface is connected.

Caution: In T0, remove the jumpers (conflict between the 48V supplied by the system and the 40 V supplied by the public exchange)..

J1_1	Remote power supply for interface 0
J1_2	Remote power supply for interface 1
J1_3	Remote power supply for interface 2
J1_4	Remote power supply for interface 3

Note: *J2_1, J2_2, J2_3 and J2_4 are storage positions for jumpers.*

Jumper J14 is used to select the LD4N card's operating mode: plug it into pins 2 and 3 = mandatory position (whether a jumper is plugged into pins 1 and 2 or not, the LD4N card is configured with implementation of additional functions reserved for future use).

Jumper positioned on SW5 or SW6 is used to select the 40V or 48V remote power supply.

Jumper positioned on SW5 (factory position) is used to select the 48V power supply.

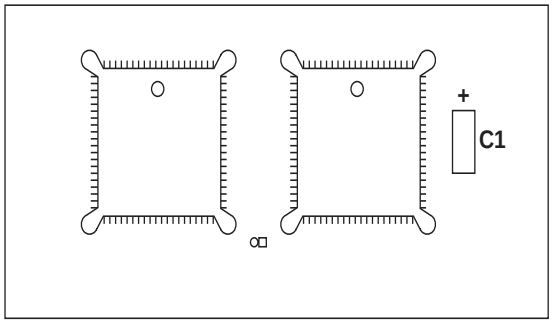
Jumper positioned on SW6 is used to select the 40V power supply.

Note: *The LD4N card has no microswitch for downloading the flash memory with a BOF3 type tool (automatic detection).*

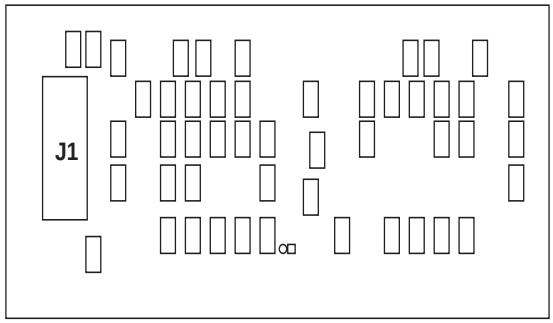
Description of lights

Nom	Couleur	Fonction
RUN	Green	Shows the operating status of the card (rapid flashing means that the card is in service)
DISABLED	Orange	Not used

ADPCM card (HJ4055A)



Vue côté composants



Vue côté soudure

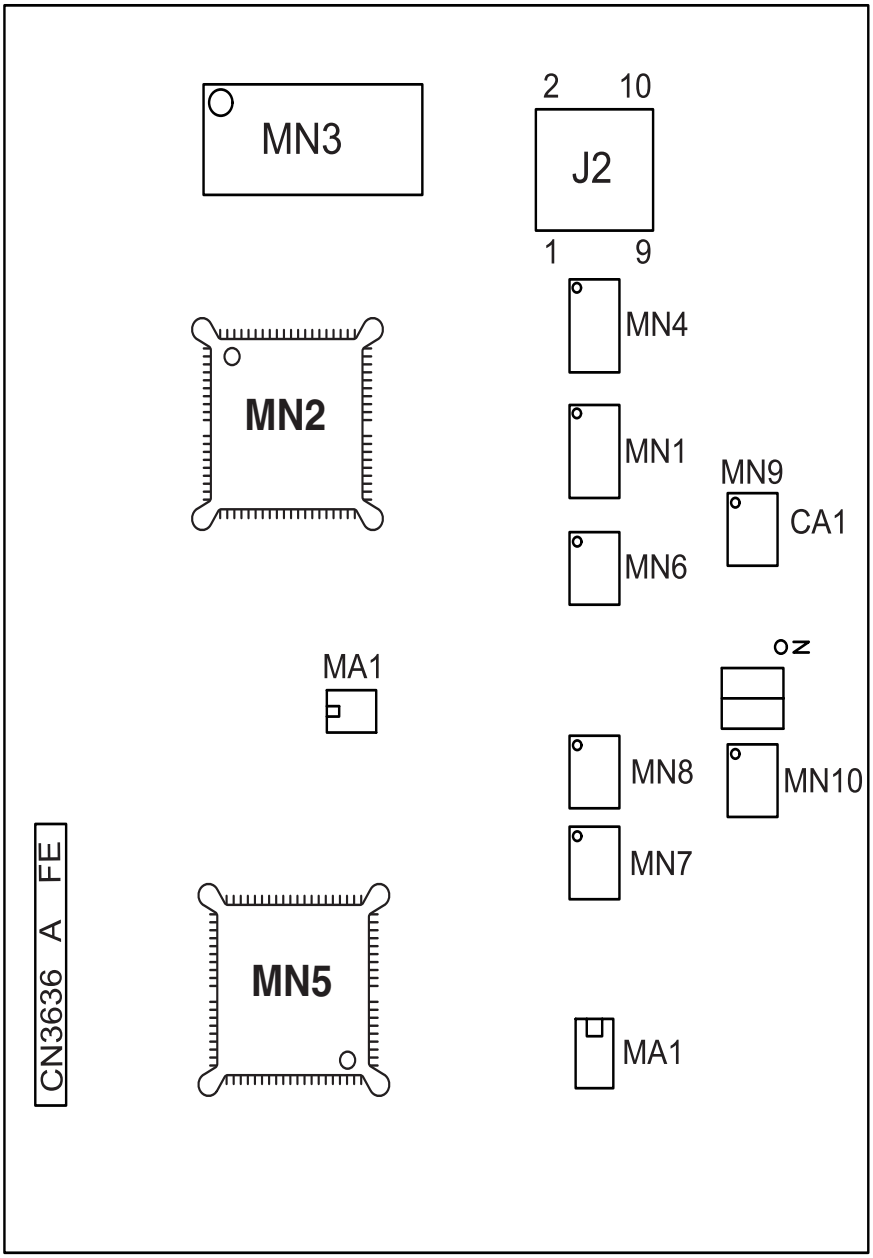
Description of the card

This card provides the 32 kbit/s ADPCM encoding/decoding function that enables multiple simultaneous calls on the same base station; it also provides echo damping and cancellation functions.

This card uses the J5 or J6 connector on the LD4 card.

The ISDN cards that support the ADPCM cards enable the connection of two 4-channel DECT base stations.

ADPCM 16 card (HJ4399A)



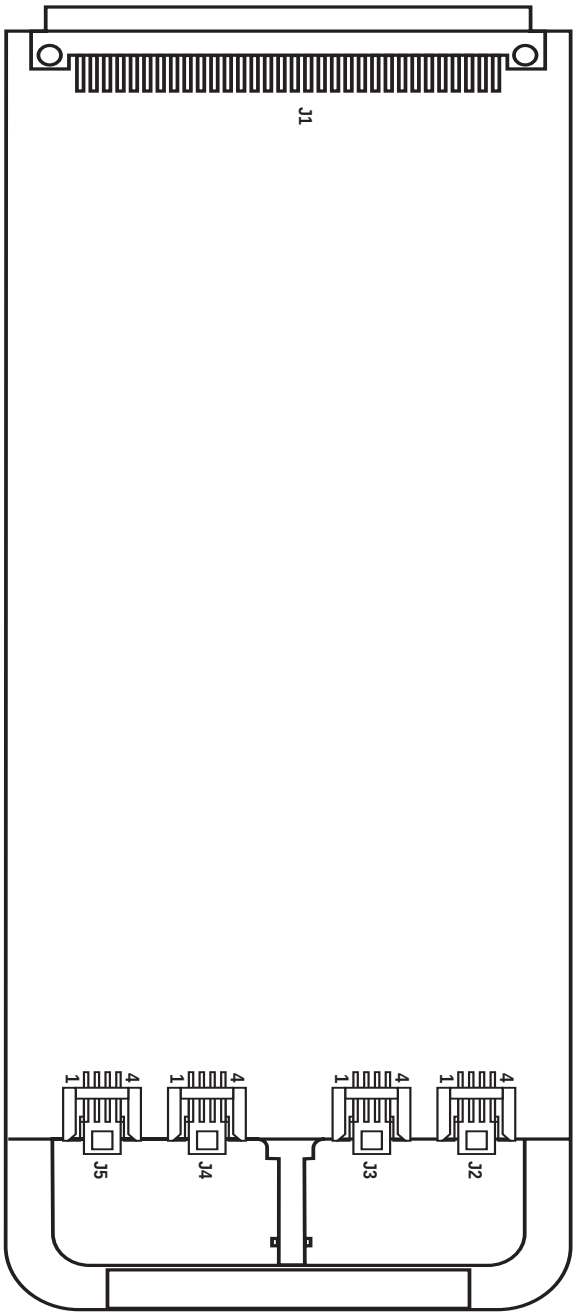
Description of the card

This card provides the 32 kbit/s ADPCM 16 encoding/decoding function that enables multiple simultaneous calls on the same base station; it also provides echo damping and cancellation functions.

This card uses the J5 and J6 connector on the LD4 card. Physically and mechanically it occupies the slot of 2 ADPCM cards (HJ4055A).

The ISDN cards that support the ADPCM 16 cards enable the connection of two 4-channel DECT base stations.

LH8 (HJ4070A)

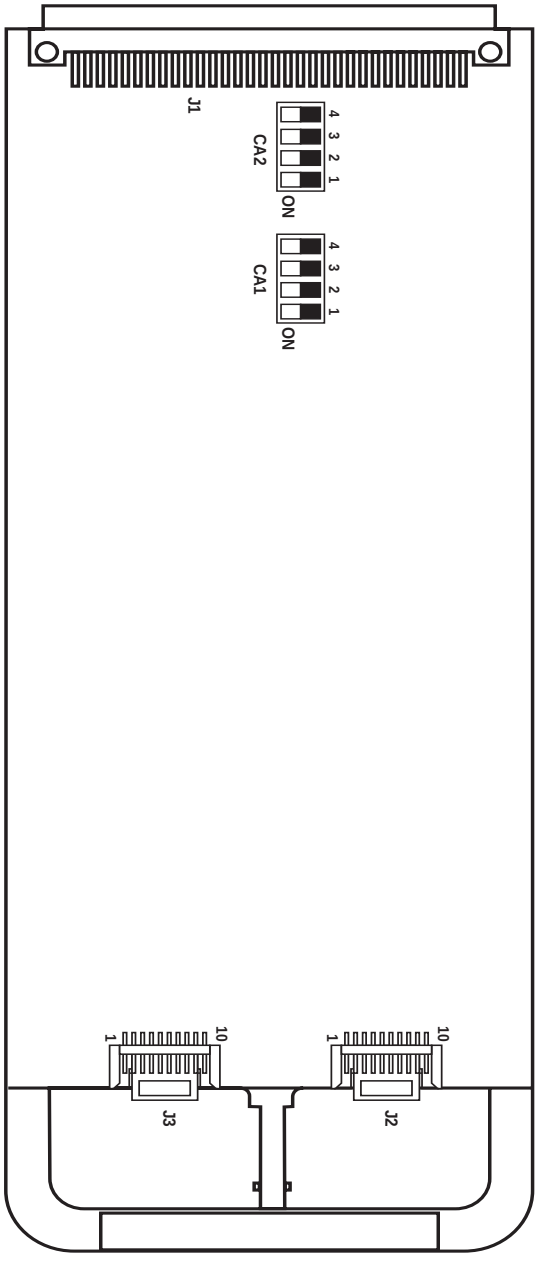


Description of the card

The LH8 card provides the same features as the LA8 card, plus an extra feature that lights an LED on sets if messages have been left (for hotel configuration).

Refer to the LA8 card for the description of the connectors.

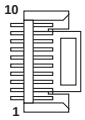
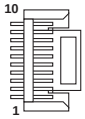
LI1 (HJ3950B)



Description of the card

The LI1 card enables the connection of two- or four-wire tie lines + E&M signalling.

Textual specification of the connectors

NAME	Function
J2 	tie line (TL) connection equipment 0
J3 	tie line (TL) connection equipment 1

Description of the switches

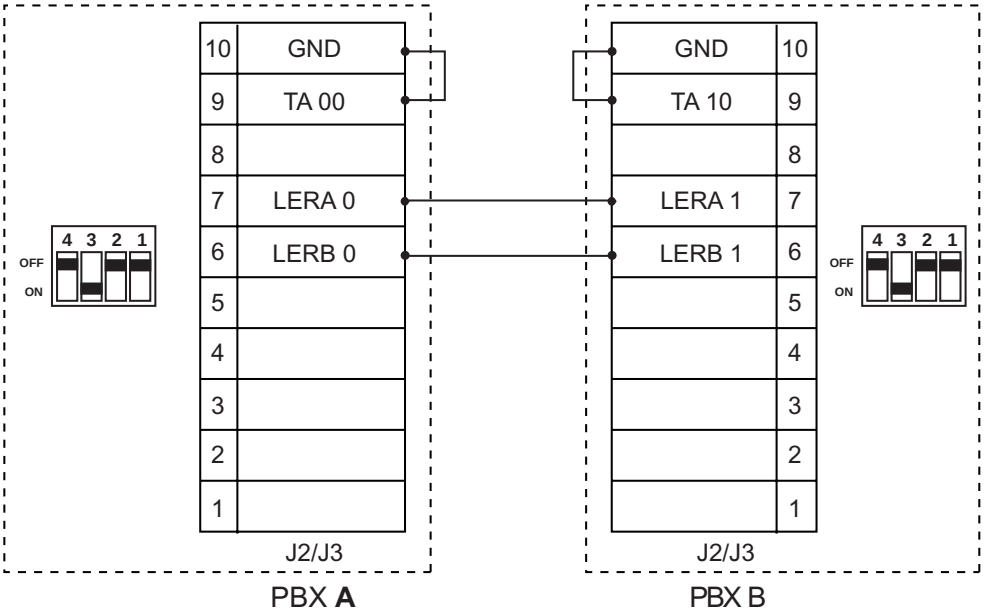
CA1 and CA2: switches CA1 (equipment 1 - connector J3) and CA2 (equipment 0 - connector J2) are used to configure the transmission type (2- or 4- wire), signalling type (50 Hz or E&M) and gain (short line or standard line).

Switches CA1.1 and CA2.1 must be set to the OFF position.

NAME	Number	Position	Function
CA1 or CA2			
	1	ON	reserved
		OFF	Tie line in service (factory delivery)
	Gain		
	2	ON	short line
		OFF	Standard line (factory delivery)
	Signalling		
	3	ON	50 Hz
		OFF	E&M (factory delivery)
	Transmission		
	4	ON	4-wire
		OFF	2-wire (factory delivery)

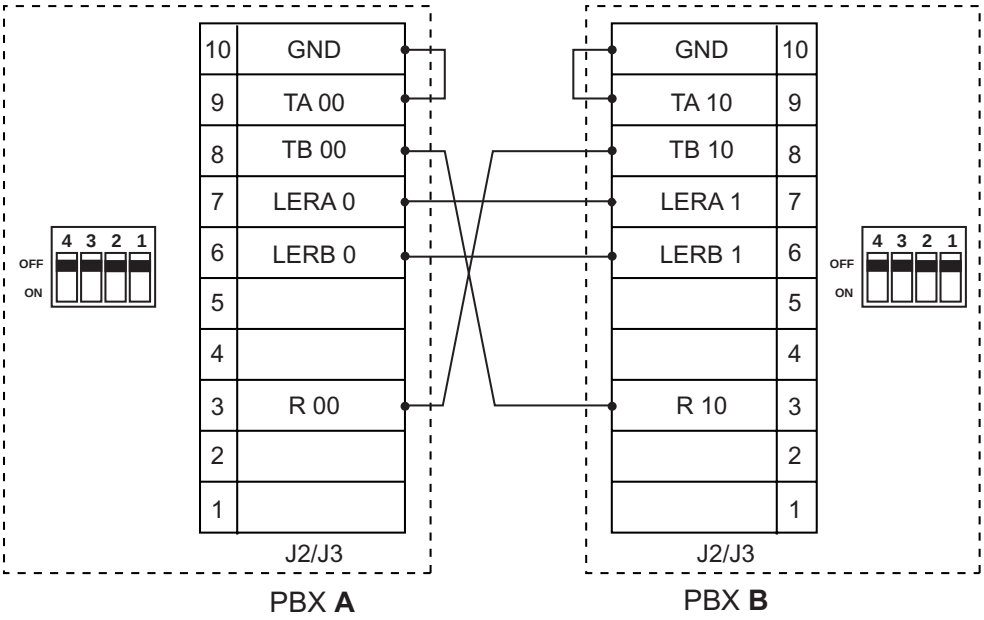
2-wire 50 Hz link

The diagram below shows the wiring for a two-wire 50 Hz link.



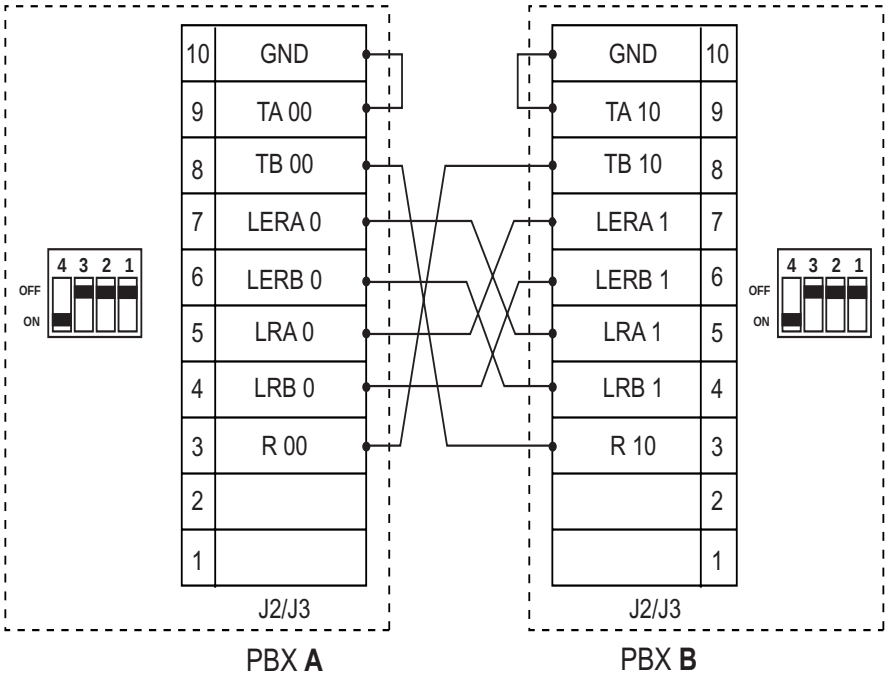
2-wire + E&M link

The diagram below shows the wiring for a two-wire E&M link.



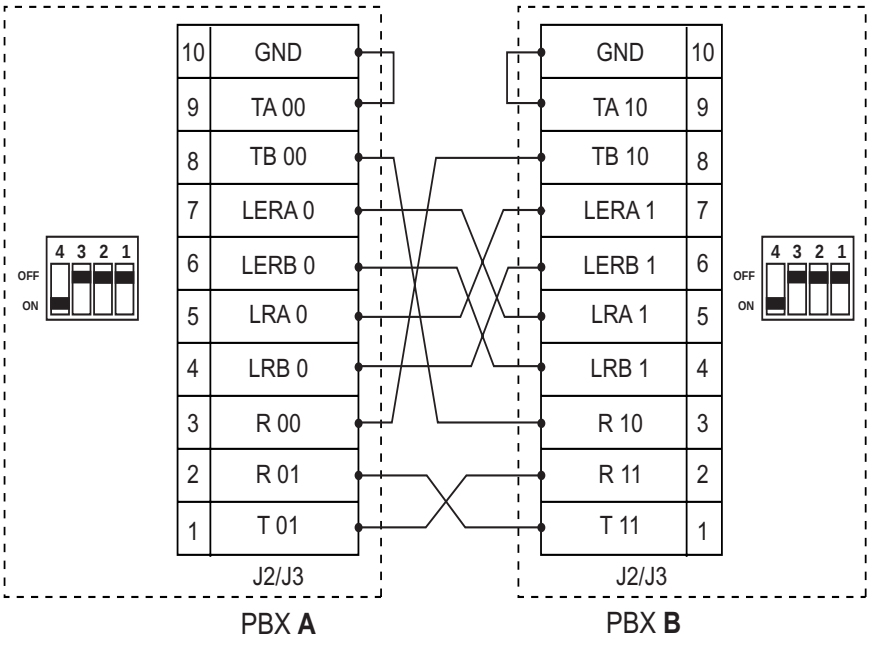
4-wire + E&M link

The diagram below shows the wiring for a four-wire + E&M link.

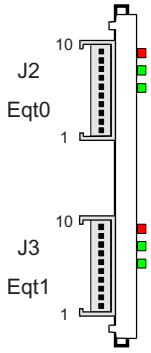


4-wire + 2 E&M link

The diagram below shows the wiring for a four-wire + 2 E&M link.

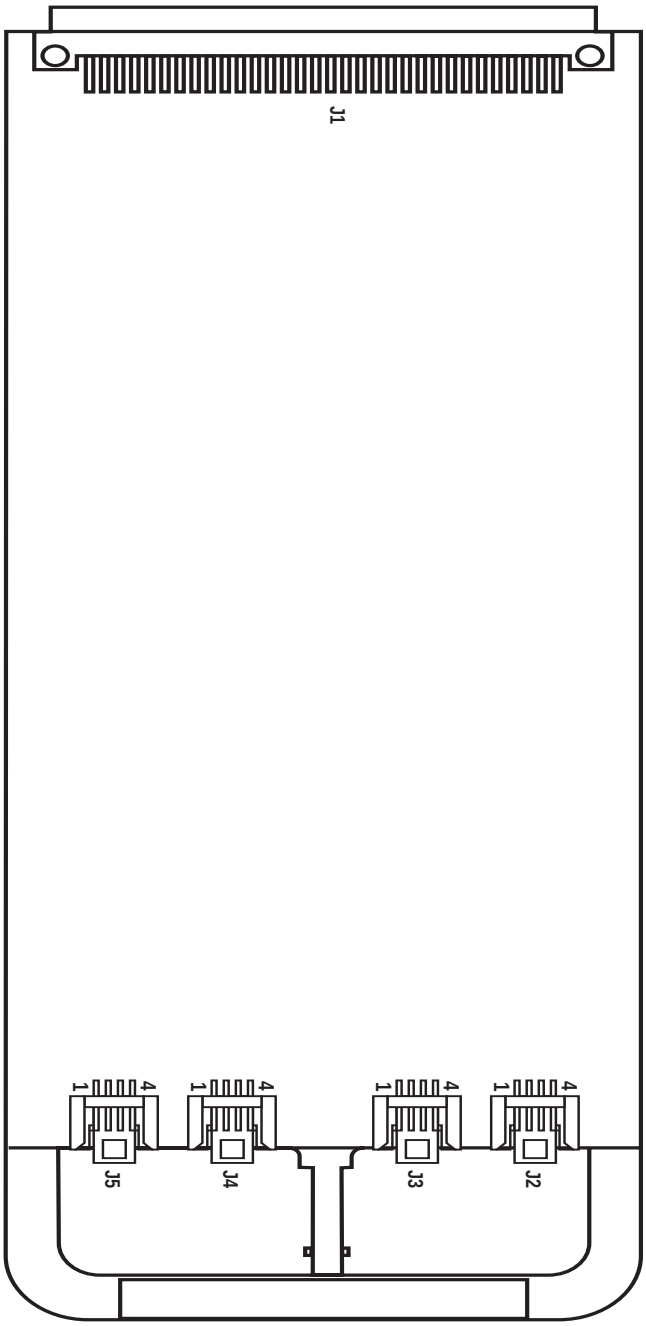


Description of lights



Color	Function
red	lights when the corresponding circuit is busy
green	lights when the corresponding circuit is in transmission mode
green	lights when the corresponding circuit is in reception mode

LM8 (HJ2781A)



Description of the card

The LM8 card enables the connection of four digital sets and four analogue sets.

Description of the connectors

NAME	Function	Description of the contacts
J2	used to connect two analogue sets	pins 4 and 3: analogue set 0 pins 2 and 1: analogue set 1
J3	used to connect two analogue sets	pins 4 and 3: analogue set 2 pins 2 and 1: analogue set 3
J4	used to connect two digital sets	pins 4 and 3: digital set 0 pins 2 and 1: digital set 1
J5	used to connect two digital sets	pins 4 and 3: digital set 2 pins 2 and 1: digital set 3

Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

Line characteristics

Analogue sets

Line resistance, including set: 500 Ohms

- 0.4 mm cable: approximately 2 km (maximum distance between set and cabinet)
- 0.6 mm cable: approximately 3.5 km (maximum distance between set and cabinet)

The voltage and current measured at the set terminals must be:

- U = 12.4 V / I = 25 mA

All the analogue sets connected to the PBX must be have the following settings:

- Z impedance ref. 2 (complex impedance)
- self-regulating

Digital sets

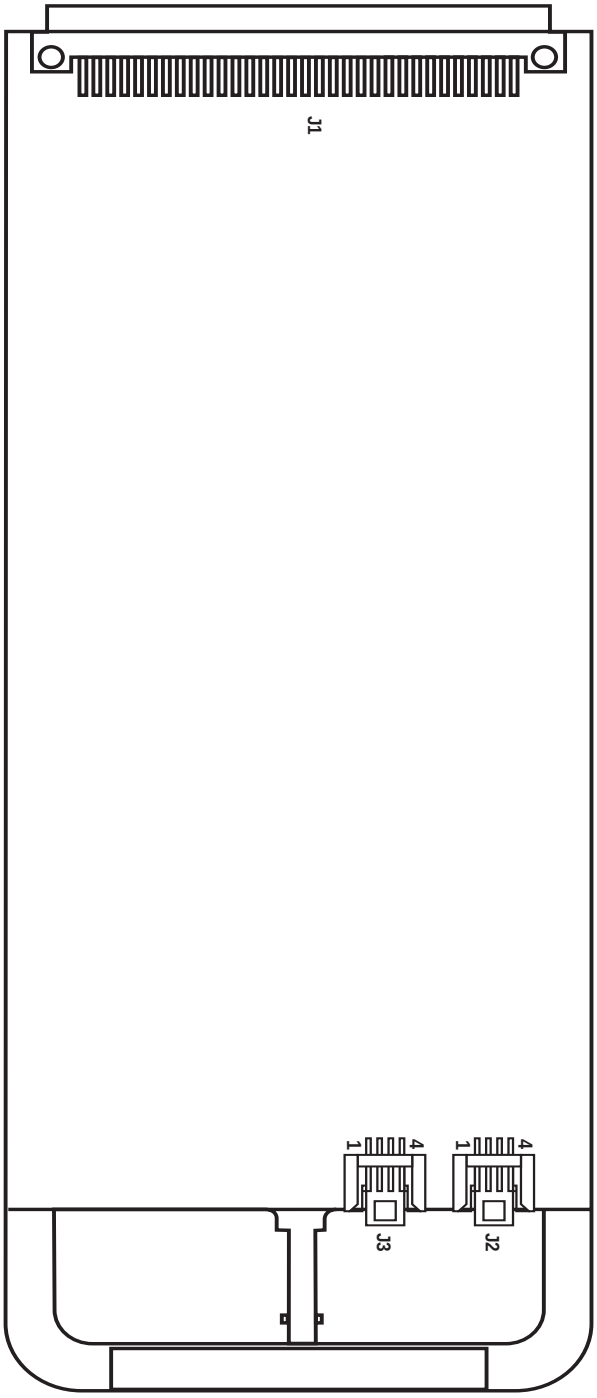
- 0.4 mm cable: approximately 1 km (maximum distance between set and cabinet)
- 0.6 mm cable: approximately 1.8 km (maximum distance between set and cabinet)

The voltage and current measured at the set terminals must be:

- U = 12.4 V / I = 25 mA

All digital sets are protected against most problems caused by human error: short-circuiting, connection to an analogue extension socket, etc. In such cases, the set will remain silent.

LN4 (HJ2845A)



Description of the card

The LN4 card enables the connection of four digital sets.

Description of the connectors

NAME	Function	Description of the contacts
J2	used to connect two digital sets	pins 4 and 3: digital set 0 pins 2 and 1: digital set 1
J3	used to connect two digital sets	pins 4 and 3: digital set 2 pins 2 and 1: digital set 3

Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

Line characteristics

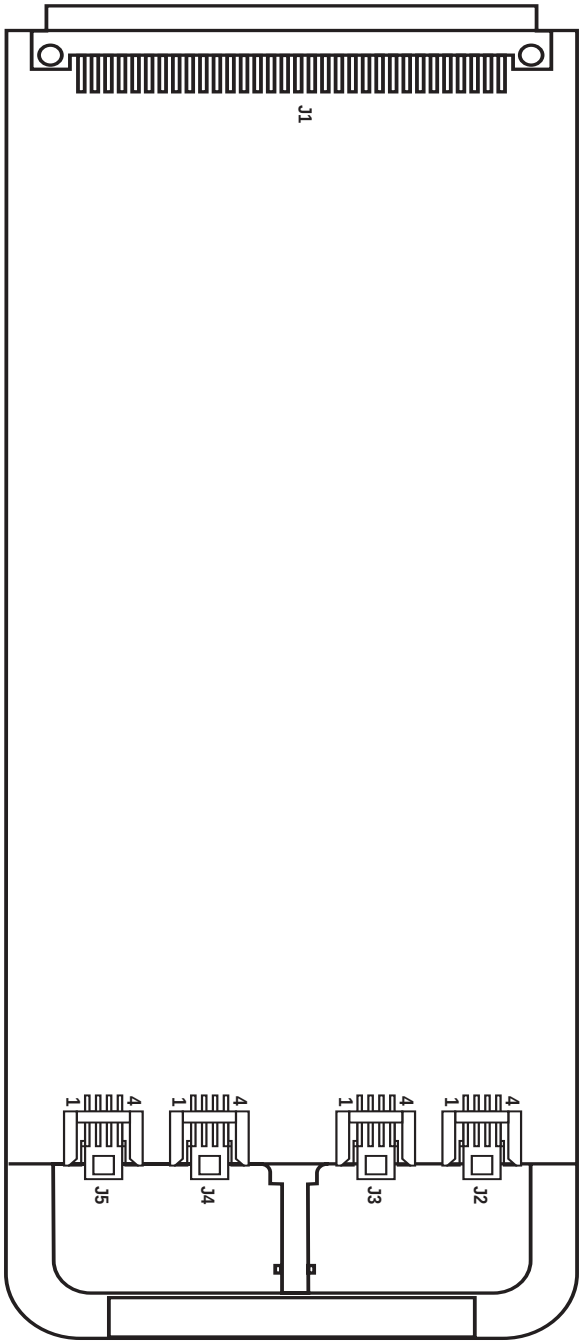
- 0.4 mm cable: approximately 1 km (maximum distance between set and cabinet)
- 0.6 mm cable: approximately 1.8 km (maximum distance between set and cabinet)

The voltage and current measured at the set terminals must be:

- U = 12.4 V / I = 25 mA

All digital sets are protected against most problems caused by human error: short-circuiting, connection to an analogue extension socket, etc. In such cases, the set will remain silent.

LN8 (HJ2764A)



Description of the card

The LN8 card enables the connection of eight digital sets.

Description of the connectors

NAME	Function	Description of the contacts
J2	used to connect two digital sets	pins 4 and 3: digital set 0 pins 2 and 1: digital set 1
J3	used to connect two digital sets	pins 4 and 3: digital set 2 pins 2 and 1: digital set 3
J4	used to connect two digital sets	pins 4 and 3: digital set 4 pins 2 and 1: digital set 5
J5	used to connect two digital sets	pins 4 and 3: digital set 6 pins 2 and 1: digital set 7

Line characteristics

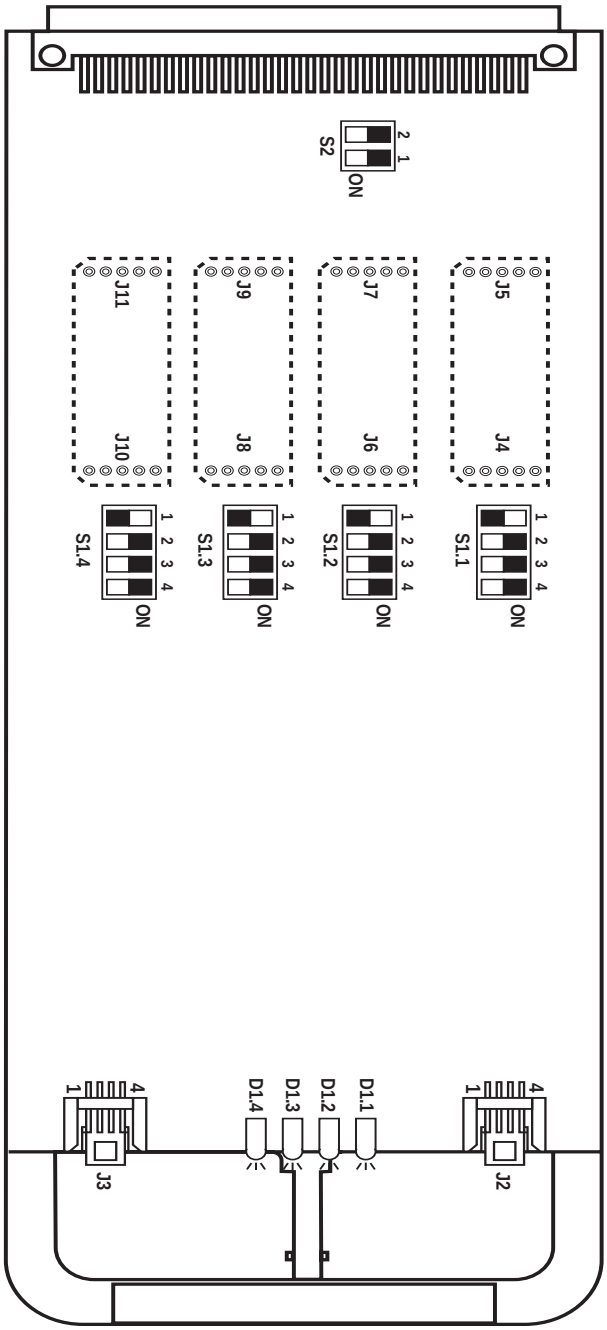
- 0.4 mm cable: approximately 1 km (maximum distance between set and cabinet)
- 0.6 mm cable: approximately 1.8 km (maximum distance between set and cabinet)

The voltage and current measured at the set terminals must be:

- U = 12.4 V / I = 25 mA

All digital sets are protected against most problems caused by human error: short-circuiting, connection to an analogue extension socket, etc. In such cases, the set will remain silent.

LR4 (HJ2765BA)



Description of the card

The LR4 card enables the connection of four analogue trunk lines. A variant of the LR4 card is available under the reference LR4-DTOC (HJ2765FA); this variant is pre-equipped with DTOC daughter cards (see DTOC configuration below).

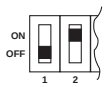
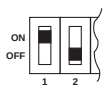
Description of the connectors

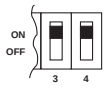
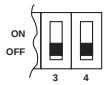
NAME	Function	Description of the contacts
J2	used to connect two analogue trunk lines	pins 4 and 3: trunk line 1 pins 2 and 1: trunk line 2
J3	used to connect two analogue trunk lines	pins 4 and 3: trunk line 3 pins 2 and 1: trunk line 4
J4 and J5	used to connect the charge detection card for LR1	
J6 and J7	used to connect the charge detection card for LR2	
J8 and J9	used to connect the charge detection card for LR3	
J10 and J11	used to connect the charge detection card for LR4	

Description of the switches

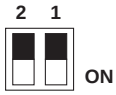
S1: switches S1.1, S1.2, S1.3, and S1.4 are used to configure the balance and short or standard line gain for each trunk line.

In the following tables, “x” represents the switch number (from 1 to 4).

S1.x.1	S1.x.2	Switch	Line impedance
OFF	ON		complex impedance (factory setting)
ON	OFF		impedance 600 Ω

S1.x.3	S1.x.4	Switch	Gain
ON	ON		Standard line gain, usable for 1.5 to 3.5 km (factory setting)
OFF	OFF		Short line gain, usable for 0 to 1.5 km

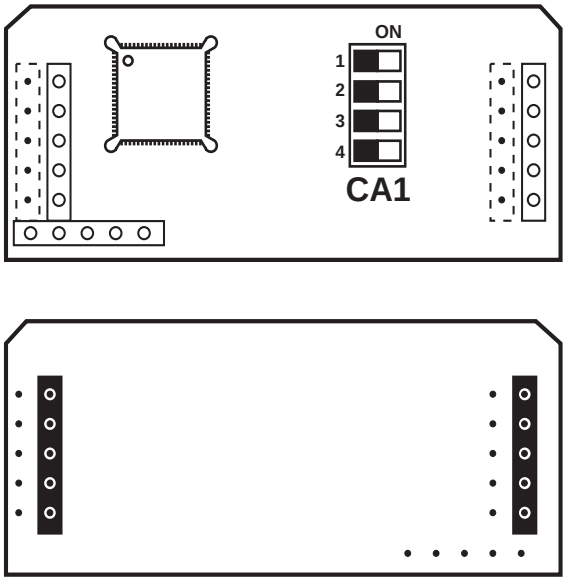
S2: this switch is used to set the charging frequency.

S2.1	S2.2	Switch	Charging frequency
OFF	OFF		12 kHz
ON	ON		16 kHz

Description of lights

NAME	Color	Status	Function
D1.1	Green	Off On Flashing	idle line seizure dialling rate
D1.2	Green	Off On Flashing	idle line seizure dialling rate
D1.3	Green	Off On Flashing	idle line seizure dialling rate
D1.4	Green	Off On Flashing	idle line seizure dialling rate

DTOC (HJ3787B)



Description of the card

This card detects the busy tone. One card of this type can be mounted on the LR4 for each trunk line.

Description of the switches

CA1.1, **CA1.2**, and **CA1.3**: these switches are used to configure the card to suit the tones used in different countries. These switches are pre-set.

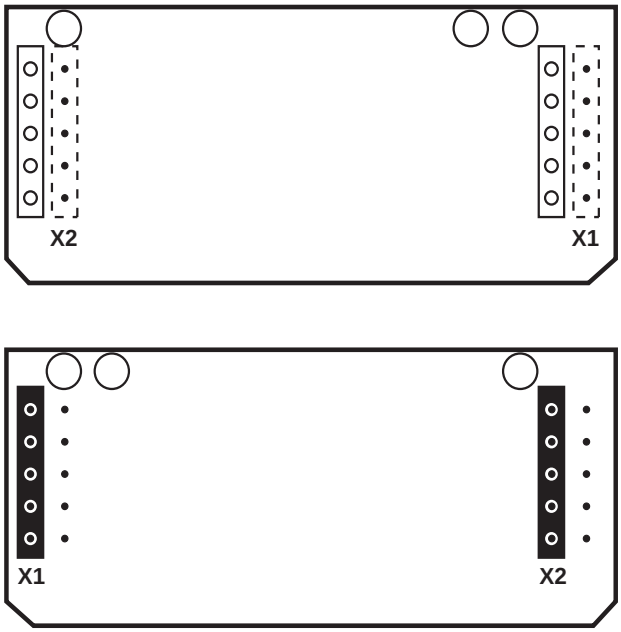
CA1.4: this switch is used to modify the sensitivity of the DTOC card.

CA1.4	Sensitivity [dBm]
OFF	-3 to -25 (factory setting)
ON	-3 to -32

Description of lights

There are no lights on this card.

FTXA (HJ2817A)



Description of the card

The FTXA card is a 50 Hz charge detection card.

One card of this type can be mounted on the LR4 for each trunk line.

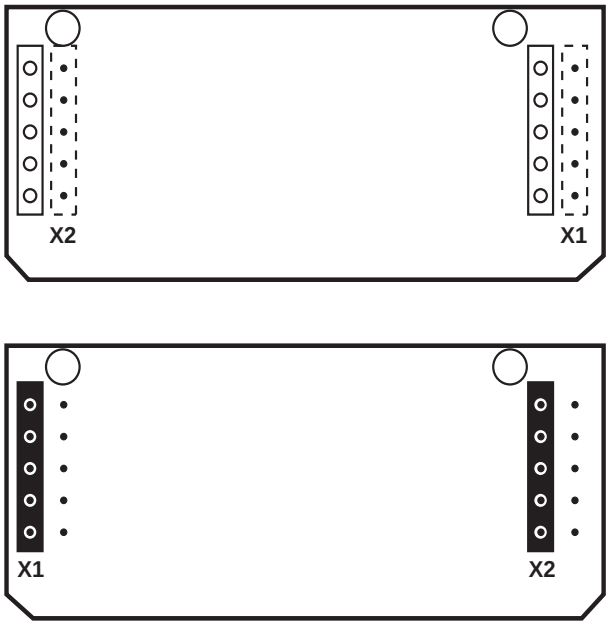
Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

FTXC (HJ2818A)



Description of the card

The FTXC card is a 12/16 kHz charge detection card.

One card of this type can be mounted on the LR4 for each trunk line.

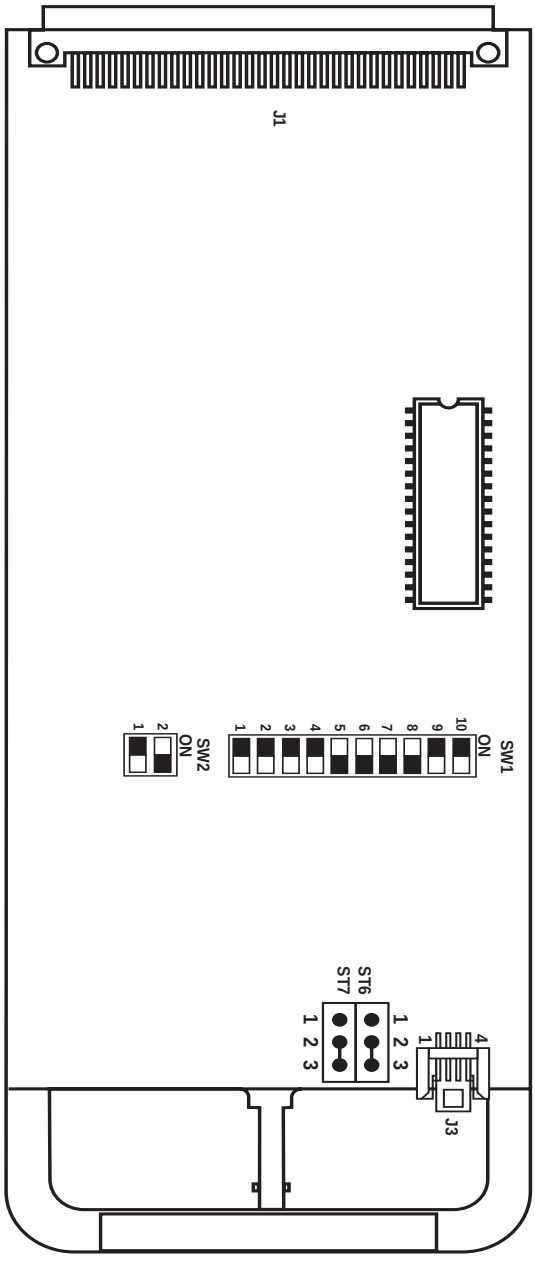
Description of the switches

There are no switches on this card.

Description of lights

There are no lights on this card.

LS0 (HJ3963A)



Description of the card

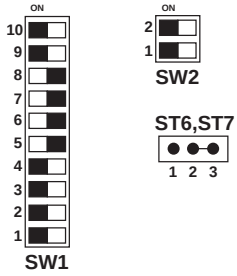
The LS0 card can be used to connect an ISDN T0 interface.

Description of the connectors

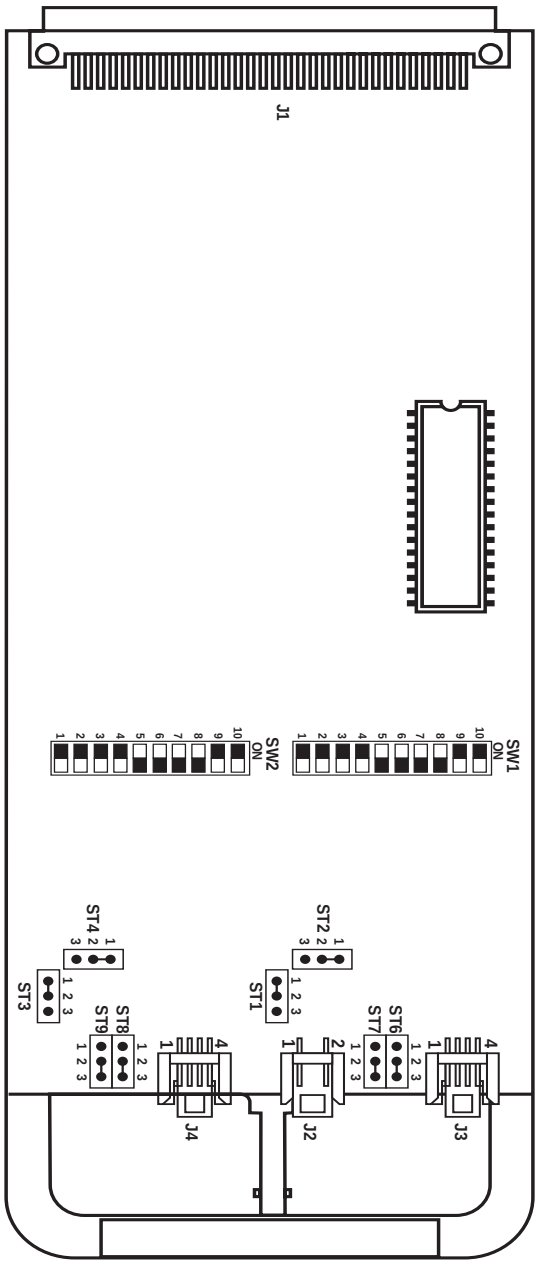
NAME	Function	Description of the contacts
J3	used to connect the T0 interface	pin 4: RT- pin 3: RT+ pin 2: ET- pin 1: ET+

Description of the switches

Set the switches and jumpers (SW1, SW2, ST6, and ST7) as shown in the diagram below:



LS1 (HJ3924A)



Description of the card

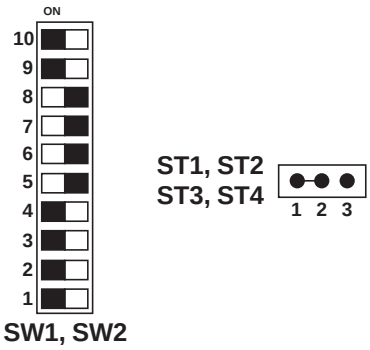
The LS1 card enables the connection of two T0 interfaces, one T0 and S0 interface, or two S0 interfaces.

Textual specification of the connectors

NAME	Function	Description of the contacts
J2	used to connect the 40 V power supply for the ISDN terminals (connect to the ADS300 power supply module)	pin 2: (+) 40 V pin 1: (-)
J3	used to connect the T0 or S0 interface on equipment 0	T0 configuration (J3 or J4) pin 4: RT- pin 3: RT+ pin 2: ET- pin 1: ET+ **RT**: **R**eception on **T interface** **ET**: **T**ransmission on **T** interface S0 configuration (J3 or J4) pin 4: ES- pin 3: ES+ pin 2: RS- pin 1: RS+ **ES** : **T**ransmission on **S** interface **RS**: **R**eception on **S** interface
J4	used to connect the T0 or S0 interface on equipment 1	

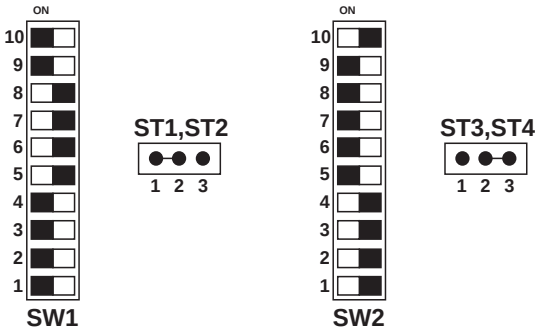
Description of the switches

2 T0: switch configuration with a T0 on both equipment connectors (J3 and J4):

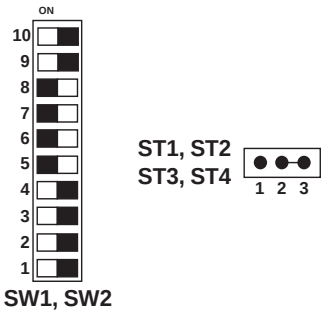


Note: *If two T0 interfaces are installed, the J2 connector is not used.*

1 T0 / 1 S0: switch configuration with a T0 as equipment 0 (J3) and an S0 as equipment 1 (J4):



2 S0: switch configuration with an S0 on both equipment connectors (J3 and J4):



Characteristics of the S0 bus

The number of terminals connected is dependent on the type and length of bus. Configure switches J6 and J7 (interface 1) and J8 and J9 (interface 2) according to the S0 bus type.

Switch configuration for the S0 bus on interface 1:

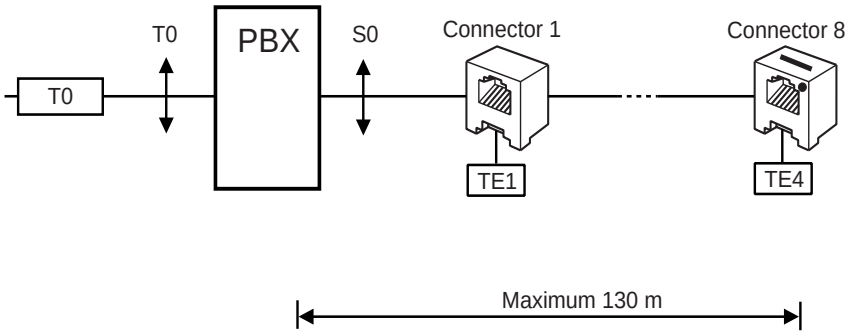
NAME	Position and function
ST6/ST7	1-2; Y bus
ST6/ST7	2-3; straight line bus

Switch configuration for the S0 bus on interface 2:

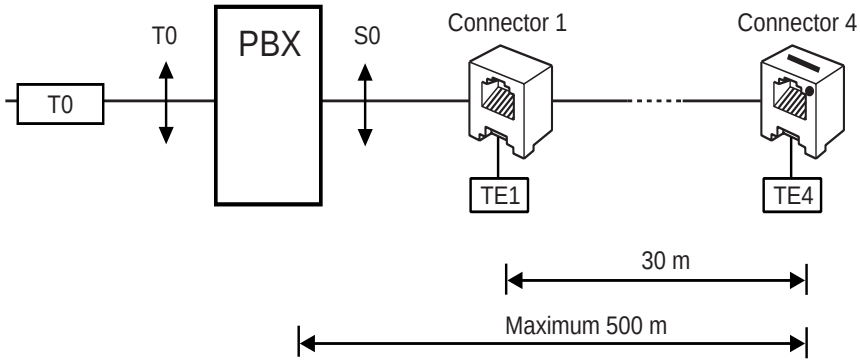
NAME	Position and function
ST8/ST9	1-2; Y bus
ST8/ST9	2-3; straight line bus

S0 bus types

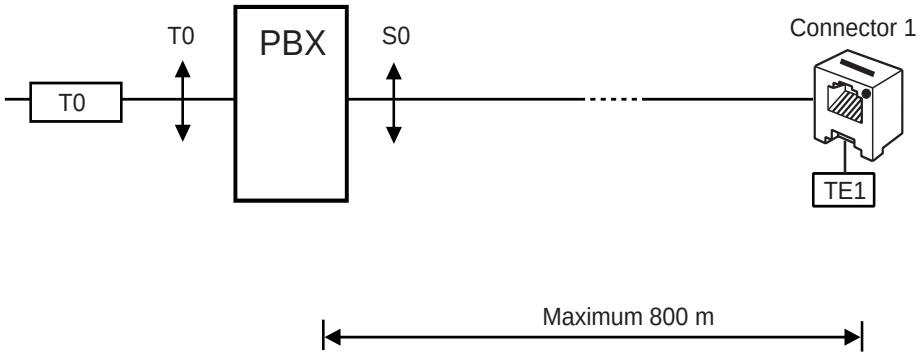
In the diagrams the S0 bus terminator is shown by a dot.



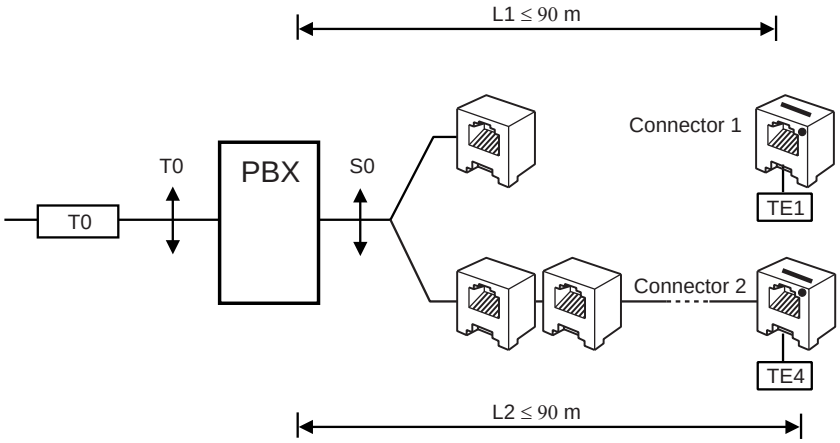
Maximum number of devices on a **short bus**: - 8 connectors
- 4 terminals



Maximum number of devices on a **long bus**: -4 connectors
- 4 terminals



Maximum number of devices on a **point-to-point bus**: - 1 connector
- 1 terminal

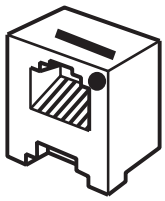


Maximum number of devices on a **Y bus**: - 8 connectors (n1 + n2)
- 4 terminals (where L1 and L2 ≤ 130 m).

S0 bus terminator

S0 bus terminator

A 100 Ohm terminator must be fitted to each end of an S0 bus.

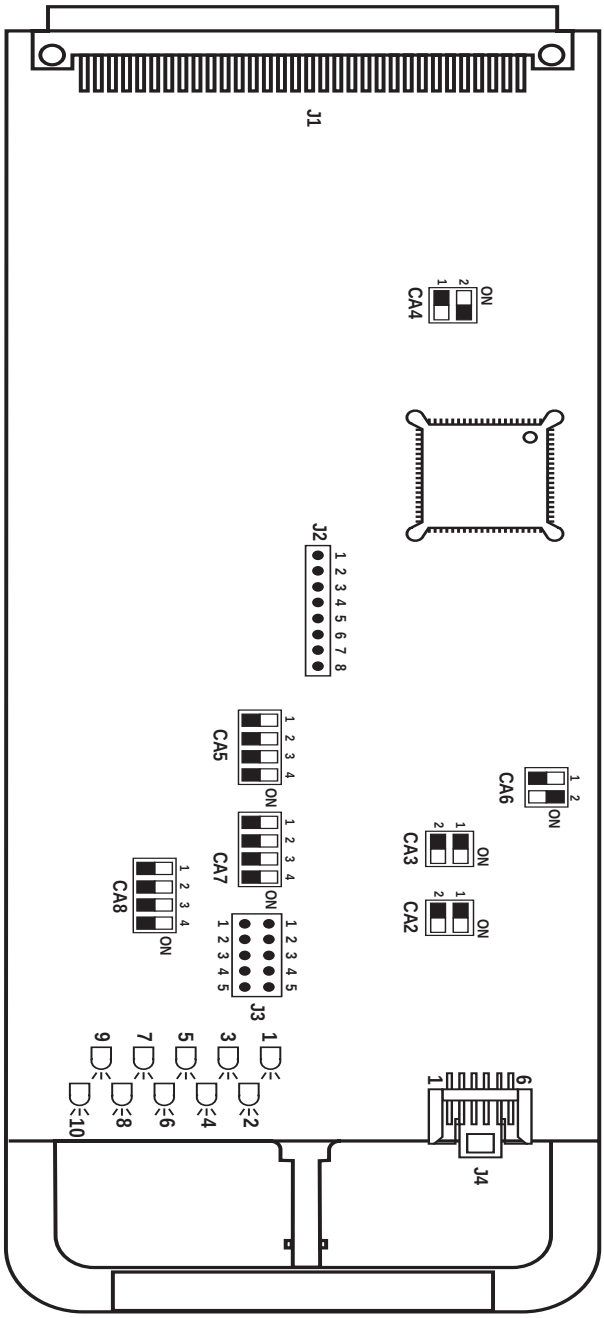


Power to terminals

ISDN terminals are powered by the S0 bus. Connect the 40 V power supply to the J2 connector on the LS1 card.

2	+40V
1	0V

LT2 (HJ3970B)



Description of the card

The LT2 card enables operation in ISDN T2/S2 or PCM mode, both at 2.048 Mbits/s. These modes are selected using the various switches on the card.

Description of the connectors

NAME	Function	Description of the contacts
J2 and J3	not used (factory tests)	
J4 	used to connect the T2 interface from the TNL or another LT2 card (transmission and reception pair).	pin 6: screen pins 5 and 4: to TNL, transmission pair pin 3: screen pins 2 and 1: to TNL, reception pair

Description of the switches

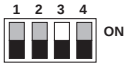
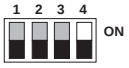
CA8: this switch sets either ISDN (T2/S2) or PCM mode.

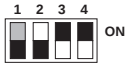
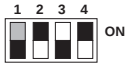
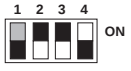
CA8.4	CA8.3	CA8.2	CA8.1	PCM type
OFF	OFF	OFF	OFF	LT2 card used in T2-S2 mode.* (factory setting)
ON	OFF	OFF	OFF	PCM E1 (SF) dB ISDN E1 at 1.544 Mbps (export)
OFF	ON	OFF	OFF	PCM E1 (SF) 7.5 d**B** ISDN E1 at 1.544 Mbps (export)
ON	ON	OFF	OFF	PCM E1 (SF) 15 d**B** ISDN E1 at 1.544 Mbps (export)
OFF	OFF	ON	OFF	Extended PCM E1 (ESF) 0 dB ISDN E1 at 1,544 Mbps (export)
ON	OFF	ON	OFF	Extended PCM E1 (ESF) 7.5 d**B** ISDN E1 at 1.544 Mbps (export)
OFF	ON	ON	OFF	Extended PCM E1 (ESF) 15 dB ISDN E1 at 1.544 Mbps (export)
ON	ON	ON	OFF	PCM (SF) 0 dB PCM E1 at 1.544 Mbps (export)
OFF	OFF	OFF	ON	PCM (SF) 7.5 dB PCM E1 at 1.544 Mbps (export)
- Folio 1 de 2 -				

CA8.4	CA8.3	CA8.2	CA8.1	PCM type
ON	OFF	OFF	ON	PCM (SF) 15 dB PCM E1 at 1.544 Mbps (export)
OFF	ON	OFF	ON	Extended PCM (ESF) 0 dB PCM E1 at 1.544 Mbps (export)
ON	ON	OFF	ON	Extended PCM (ESF) 7.5 dB PCM E1 at 1.544 Mbps (export)
OFF	OFF	ON	ON	Extended PCM (ESF) 15 dB PCM E1 at 1.544 Mbps (export)
ON	OFF	ON	ON	PCM E2 (32TS) 2 Mbps
OFF	ON	ON	ON	ISDN T2 E1 2 Mbps 16TS
ON	ON	ON	ON	Not used
- Folio 2 de 2 -				

** Use of T2 or S2 is confirmed through the user interface.*

CA5 and **CA7**: configuration of the line coding, remote alarms and distances.

CA5.1	CA5.2	CA5.3	CA5.4	CA5 switch	PCM type
OFF					Line coding = B8ZS (Binary 8 zero suppression)
ON					Line coding = AMI (Alternate Mark Inversion)
	OFF				Remote alarm = type A
	ON				Remote alarm = type B
		OFF			Reception level = 6 dB (factory setting)
		ON			Reception level = 18 dB
			OFF		Synchronisation with the PCM clock possible
			ON		Synchronisation with the PCM clock not possible

CA7.1	CA7.2	CA7.3	CA7.4	CA7 switch	PCM type
OFF					24 TS PCM in ANSI T1 mode (factory setting)
ON					24 TS PCM in CCITT mode
	OFF	OFF	OFF		Rated transmission level (factory setting)
	OFF	OFF	ON		Line length = 0-35 m (0-3,505.20 cm)
	OFF	ON	OFF		Line length = 25-65 m (82-213 ft)
	OFF	ON	ON		Line length = 55-95 m (180-9,509.76 cm)
	ON	OFF	OFF		Line length = 115-155 m (377-15,514.32 cm)
	ON	OFF	ON		Line length = 145-185 m (476-18,501.36 cm)
	ON	ON	OFF		Line length = 175-210 m (574-689 ft)
	ON	ON	ON		Line length = -18 db

CA6, **CA3** and **CA2:** these switches are used to configure the line impedance.

CA6.1	CA6.2	CA3.1	CA3.2	CA2.1	CA2.2	Switch	Line impedance
OFF	OFF	ON	ON	ON	ON		100 Ω (T1)
ON	OFF	ON	ON	OFF	OFF		75 Ω (E1)
OFF	ON	OFF	OFF	OFF	OFF		120 Ω (E1)

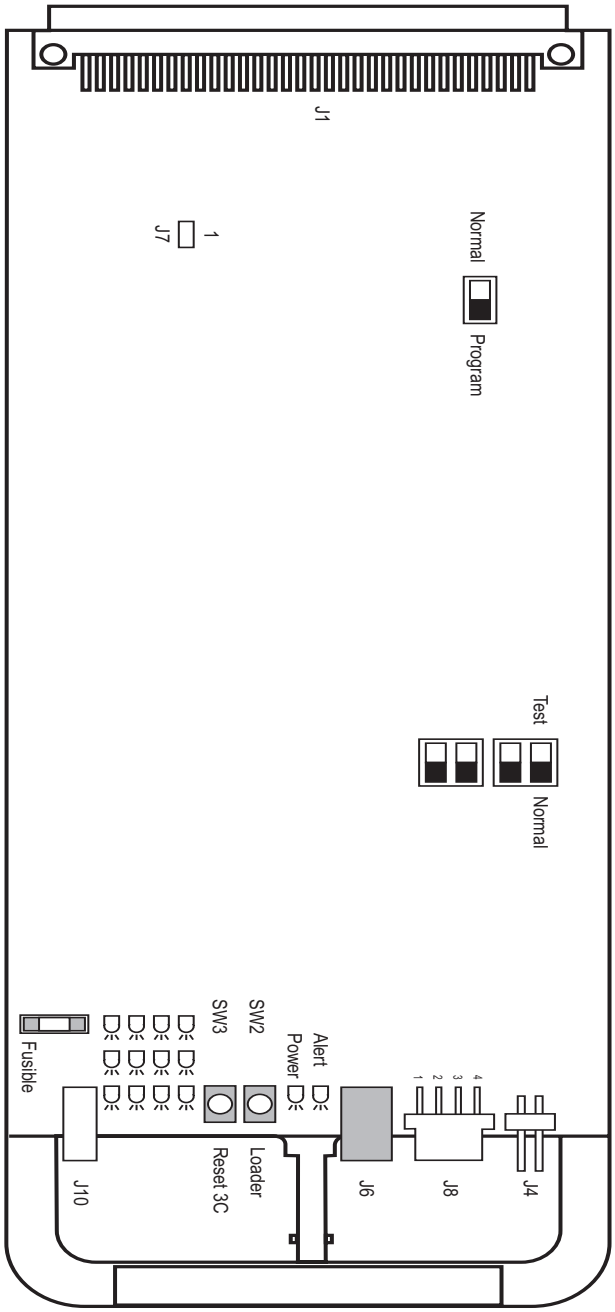
CA4: this switch is used to configure the clock and switch the card to programming mode.

CA4.1	CA4.2	Switch	Mode
OFF	OFF		Clock signal not used
ON	OFF		Normal mode - Clock signal used (factory setting)
	ON		Programming mode

Description of lights

NAME	Color	Function
REA5	Yellow	Flashes rapidly when the card is used
COM	Green	Status of the D channel flashes when level 2 is established on steady when one or more calls are established
CF	Red	**C**lock **m**issing
LFA	Red	**F**rame **A**lignment**L**oss
AIS	Red	**A**larm **I**ndication **S**ignal
FA	Red	**R**emote frame **a**larm (sent by the remote unit to indicate a local alarm)
PVM	Red	**M**ulti-**f**rame **a**lignment loss
MSE	Red	**N**o incoming **s**ignal
SIAM	Red	CRC4 errors detected for over 50 ms
AMD	Red	Wrong E bit detected in CRC4 mode for over 50 ms

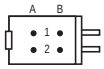
RL1 (HJ4129A)



Description of the card

The RL1 card provides a router to enable interconnection of LANs via the ISDN network; it also provides an S0 interface.

Description of the connectors

NAME	Function
J4 	Used to connect the configuration console of the router
J6	Ethernet connection
J7	Not fitted
J8	Reserved for factory testing
J10	External power supply connector for the router

Description of the switches

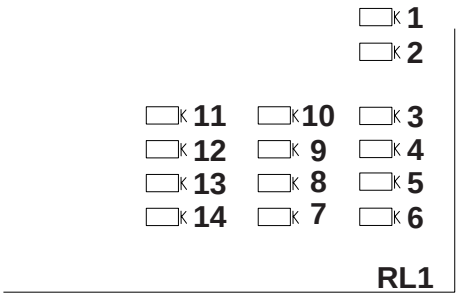
CA1 and **CA2:**

CA1 and	Position	Function
	ON	Normal mode, leave set to ON
	OFF	Reserved for factory testing

SW1: you can select programming mode by setting switch SW1 to ON.

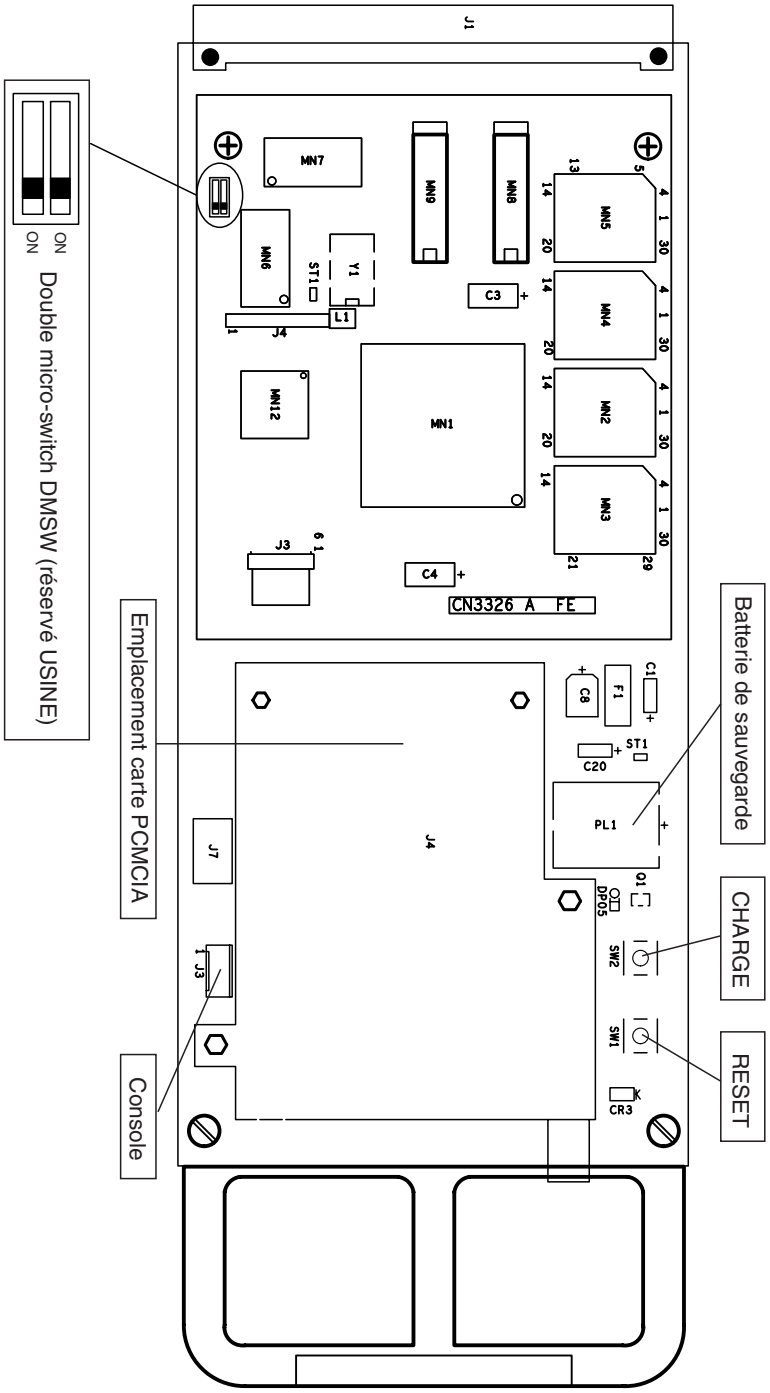
Description of lights

No.	Color	Function
1	Red	Alarm
2	Green	Power supply
3	Green	Ethernet link operational
4	Green	S0 interface operational
5	Green	Channel B1 busy
6	Green	Channel B2 busy
7	Green	S0 interface capacity used - 1%
8	Green	S0 interface capacity used -5%
9	Green	S0 interface capacity used -15%
10	Green	S0 interface capacity used -25%
11	Green	S0 interface capacity used -50%
12	Green	S0 interface capacity used -75%
13	Green	S0 interface capacity used -85%
14	Red	S0 interface capacity used -100%



MVD (HJ3947A)

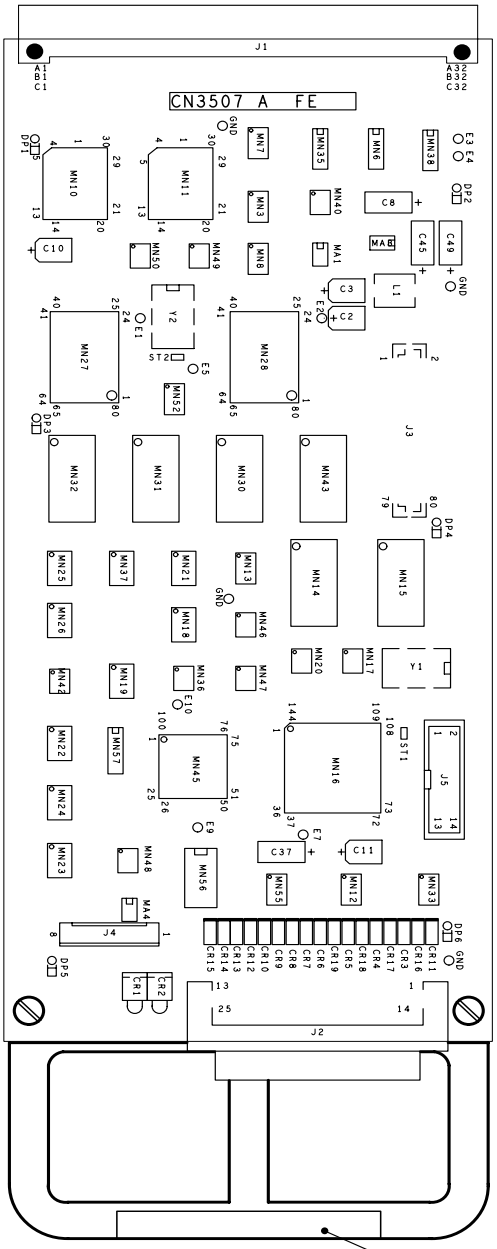
Refer to the MC7460 Integrated voice mail installation management manual (MCPS6938ABAAA01).



BVF (HJ4217A) – daughter card **FBVF** (HJ4218A)

The BVF card is only compatible with software release 11.6 (GEN B6B) and above.

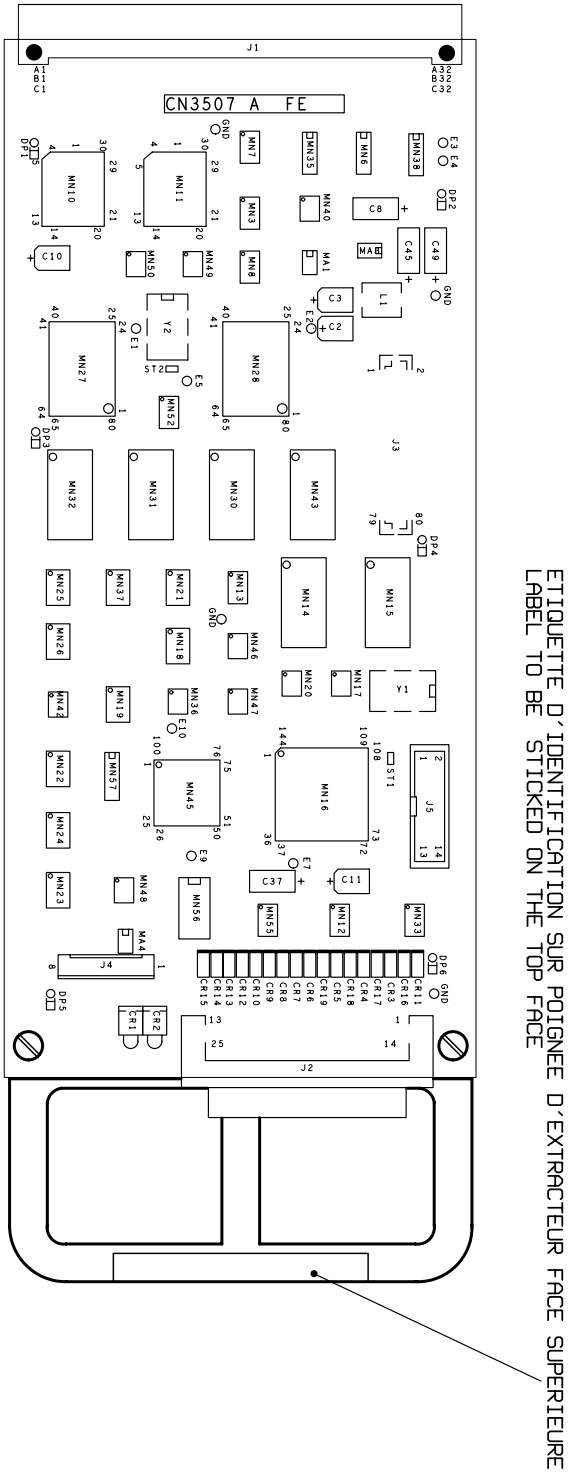
Refer to the BIP Message voicemail card installation and implementation guide (MCPS8830ADAAA01).



BVF2 (HJ4217B) – daughter card **FBVF2** (HJ4218B)

The BVF2 card is only compatible with software release 11.6 (GEN B6B) and above.

Refer to the BIP Message voicemail card installation and implementation guide (*PS8965A*).



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Appendix B: Alarm and event codes

Description of errors

Error number	Description
200	A serious software fault has been detected by the program number LC XXX. This fault causes a system restart. The information accompanying this error message will vary depending on the number of the program that generated the fault. **Action** Monitor the error. The system automatically restarts when this error occurs.
201	A serious software fault has been signaled by the program number LC XXX. For example, incorrect data received. The information accompanying this error message will vary depending on the number of the program that generated it. **Action** Monitor the error.
209	The system has insufficient resources to handle widespread access to data. Two types of associated information may be displayed: a logical UCG number: 1 byte a source error: 1 word 1 word (non-significant) information depending on source error; 1 word *1 word is displayed as 2 inverted bytes. **Action** Monitor the error.
20A	Low priority IRMX tasks (FEH) are not regularly executed by UC software (software execution overload). **Action** Monitor the error.
20C	There is insufficient reserved memory to send a signalling message. **Action** Monitor the error. The system automatically restarts when this error occurs.
- Folio 1 de 8 -	

Error number	Description
20D	There is an incorrect PAS type file parameter. (INDEX = fault code AGD). the AGD number of the accessed table: 1 byte the logic cluster number the number of the PAS file AGD descriptor: 1 word *1 word is displayed as 2 inverted bytes. 3=IRMX286 primitive call problem. 5= AGD internal fault: internal file full, incorrect message code in AGD message 6=BASIC I/O call problem 7=no resources (memory space), GEDI primitive call problem 9=fault, transaction duration value too high. 50/5A = fault, inconsistent or missing file Disk/Mem 51/5B = fault, inconsistent or missing descriptor header Disk/Mem 52/5C = fault, inconsistent or missing table descriptor Disk/Mem 53/5D = error, function number parameter incorrect Disk/Mem 54/5E = error, descriptor number parameter incorrect Disk/Mem 55/5E = error, table number parameter incorrect Disk/Mem 56/60 = error, type of table accessed incorrect Disk/Mem 57/61 = error, index parameter incorrect Disk/Mem 58/62 = error, length position parameter incorrect Disk/Mem **Action** Contact the maintenance support team.
20F	The CPU software no longer has sufficient memory resources (IRMX objects, memory area). -the calling IRMX task token: 1 word. -the IRMX86/286 error code: 1 word. **Note**: The index gives the type of request responsible for the error: 1, 2, 3, 10H: task creation. 4 : mailbox creation, 5, 6 : signalling channel creation, 7 : segment creation, 8 : large memory area, 9 : small memory area. *1 word is displayed as 2 inverted bytes. **Action** Monitor the error. The system quickly restarts the CPU when this error occurs
- Folio 2 de 8 -	

Error number	Description
214	A programming error was detected by the IRMX286 monitor. If the IRMX error code is different from C008H/C00AH/C00CH: - error code IRMX286 (appendix 3): 1 word. - DS, ES, DI, SI, BP, SP, BX, DX, CX, AX: 14 words. fault code, IP, CS, flags - first words in stack. If the IRMX error code is C008H/C00AH/C00CH: - error code IRMX286: 1 word. - processor error code: 1 word. - IP, flags: 2 words. - AX, CX, DX, BX, SP, BP, DI: 8 words. - ES, CS, SS, DS: 4 words. - first words in stack (SS:SP). *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts when this error occurs.
601	The OCX card does not recognise an address. Program registers interrupted: - register NMI, BP, DS, ES, DI, SI, BP, SP. - BX, DX, CX, AX, IP, CS, Flags. - first words in stack. *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts when this error occurs.
602	Software watchdog has been triggered by the CPU software loop or interrupt. Program registers interrupted: - register NMI, BP, DS, ES, DI, SI, BP, SP. - BX, DX, CX, AX, IP, CS, Flags. - first words in stack. *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts when this error occurs.
603	- Incorrect data has been transmitted by the system bus. Program registers interrupted: REB, BP, DS, ES, DI, SI, BP, SP. BX, DX, CX, AX, IP, CS, Flags. first words in stack. *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts when this error occurs.
604	An incorrect I/0 card access instruction was given. **Action** Contact the maintenance support team. The state of the card is changed to faulty.
606	An overall power supply problem has occured. **Action** Monitor the error. The system automatically restarts when this error occurs.
- Folio 3 de 8 -	

Error number	Description
607	The processor has shut down. Program registers interrupted: - REB, IP, CS, flags - DS, ES, DI, SI, BP, SP, DX, CX, AX. *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts when this error occurs.
608	The OCT card does not recognise the I/O address. Program registers interrupted: - REB, BP, DS, ES, DI, SI, BP, SP. - BX, DX, CX, AX, IP, CS, Flags. - first words in stack. *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts when this error occurs.
700	The CLX card cannot be woken up. **Action** Monitor the error. The state of the card is changed to faulty.
701	Fatal CLX card error while loading. - the first two bytes in the IRRD area. - the first indicates the erroneous phase number. The second is the general error report. **Action** Monitor the error. The state of the card is changed to faulty.
702	There is no initialisation report from the CLX card software. **Action** Monitor the error. The state of the card is changed to faulty.
703	The CLX card does not recognise an address. - program register interrupted: - CS, IP, flags. - DS, RS, DI, SI, DX, CX, AX, BP, SP. *1 register is displayed as 2 inverted bytes. **Action** Monitor the error. The system automatically restarts the CLX card when this error occurs.
705	CLX card has a software loop or shutdown. **Action** Monitor the error. The system automatically restarts the CLX card when this error occurs.
706	A spurious NMI has occurred on the CLX card. **Action** Monitor the error. The system automatically restarts the CLX card when this error occurs.
707	Too frequent CLX card automatic restarts. Statistics counter value. **Action** Monitor the error. The system automatically changes the CLX card status to faulty when this error occurs. Contact the maintenance support team.
- Folio 4 de 8 -	

Error number	Description
708	The CLX card has detected a bus time-out. **Action** Monitor the error. The system automatically changes the CLX card status to faulty when this error occurs.
C05	The number of active operator stations is greater than that authorised by the dongle (voice mail). **Action** Check the number of stations authorised by the dongle.
1000	External clock control problem (VCXO absent?) **Action** Monitor the error. Contact the maintenance support team.
1003	No usable external reference clock for synchronising ISDN T access connections to the ISDN. Switch to the internal clock. **Action** Monitor the error.
2300	TMS file cannot be loaded. **Action** Monitor the error. The system automatically changes the state of the TMS to faulty.
2305	No reply from TMS (SGX) during supervision. **Action** Monitor the error. The system automatically reloads or restarts the TMS.
2800	Network link junctor error. **Action** Monitor the error. The system automatically changes the state of the card to faulty. Contact the maintenance support team.
3902	A persistent or intermittent alarm was detected on the T2 access to an LS2 card for a 1-minute period. If the alarm disappears for more than one minute, an end of alarm message is given. 1 : the alarm is signaled by a message with the appropriate LS2 access references and the nature of the alarm in plain text (if there are several alarms, the one with the highest priority is signaled). MS: No remote clock SIA: Alarm indication signal. PVT: Frame alignment loss. TE: Error rate. CRC4: CRC4 invalid. BitE: Invalid bit. IADC: Remote alarm indication 2 : error 3902 is accompanied by data groups describing the nature of the alarms and the number of transitions per alarm. - characters indicating the alarm type - 2 characters indicating the hexadecimal number of transitions for this alarm - space characters (blank) **Action** Monitor the error.

Error number	Description
3E00	Unsuccessful call due to establishment failure on level 2. 2 specific program words. *1 word is displayed as 2 inverted bytes. **Action** Monitor the error.
3E01	There is an activation problem on T0 access. 2 specific program words. *1 word is displayed as 2 inverted bytes. **Action** Monitor the error.
4800	The LB4 card cannot be woken up. Card number. **Action** Monitor the error. The state of the card is changed to faulty.
4801	A fatal LB4 error occurred while loading (start-up test report = failure).. The first bytes in the OCX-LB4 communication area. The first byte indicates the number of erroneous tests, the second gives the number of the first erroneous test (bits 0-3 = phase, . bits 4-6 = no test). **Action** Monitor the error. The state of the card is changed to faulty.
4802	The end of initialisation message was not received from LB4 card software. **Action** Monitor the error. The state of the card is changed to faulty.
4803	The LB4 card does not recognise an address. Program registers interrupted: - CS, IP, Flags - DS, ES, DI, SI, CX, AX, BP, SP. *1 register is displayed as 2 inverted bytes. **Action** aucune action, information pour l'opérateur.
4805	The resident LB4 card software has a software loop or interrupt. Monitor the error. The system automatically restarts the LB4 card when this error occurs.
4806	A spurious NMI has occurred on the LB4 card. Monitor the error. The system automatically restarts the LB4 card subsequent to this error.
4807	The LB4 card has automatically restarted too frequently. Statistics counter value. Monitor the error. The system automatically reacts to this error on the LAC card.
4808	The LB4 card is mute. **Action** Monitor the error. The system automatically restarts the LB4 card when this error occurs.
4900	The BS card cannot be loaded on the LB4 card. **Action** Monitor the error. The system automatically changes the base station status to faulty when this error occurs.

Error number	Description
4901	The BS and MB4 cards cannot communicate. **Action** Monitor the error. The system automatically changes the BS status to blocked when this error occurs.
4902	The communication between the BS card and the LB4 card is restored (after receiving error 4901 h). **Action** Monitor the error. The system automatically changes the BS status to in service when this error occurs.
6D00	PCM interface on LT2 card is not configured in selected mode. No action or information for the operator. **Action** The PCM interface of the LT2 card has not been configured in the selected mode. No action or information for the operator.
6D04	Onset of PCM alarm on an LT2_T1 card. - frame alarm register (8 least significant bits): 1 word. - multiframe alarm register (8 least significant bits): 1 word. 1 word is displayed as 2 inverted bytes. **Action** No action or information for the operator.
6D05	The alarm on the PCM of the LT2_T1 card ends. - frame alarm register (8 least significant bits): 1 word. - multiframe alarm register (8 least significant bits): 1 word. 1 word is displayed as 2 inverted bytes. **Action** No action, information for the operator.
6D06	Alarm of a blocked junctor on LT2_T1 card PCM. No action or information for the operator.
6D07	Alarm of a blocked junctor on LT2_T1 card PCM ends. No action or information for the operator.
6F00	2-channel DECT BS cannot be loaded. **Action** Monitor the error. The system automatically changes the base station status to faulty when this error occurs.
6F01	2-channel DECT BS cannot communicate. **Action** This error is not displayed in the logbook. The system automatically changes the BS status to blocked when this error occurs.
6F02	2-channel DECT BS communications are restored (after error 6F01h) or the BS is activated. **Action** This error is not displayed in the logbook. The system automatically changes the BS status to in service when this error occurs.
- Folio 7 de 8 -	

Error number	Description
6F03	The type of 2-channel BS coding when this error occurs is not compatible with that of the PBX. **Action** Monitor the error. The system automatically changes the base station state to faulty when this error occurs.
7004	Onset of PCM alarm on an LT2_RTC card. - frame alarm register (8 least significant bits): 1 word. - multiframe alarm register (8 least significant bits): 1 word. 1 word is displayed as 2 inverted bytes. **Action** No action, information for the administrator
7005	The alarm on the PCM of the LT2_RTC card ends. - multiframe alarm register (8 least significant bits): 1 word. 1 word is displayed as 2 inverted bytes. **Action** No action, information for the administrator
7006	Alarm of a PCM blocked junctor on LT2_RTC card **Action** No action, information for the administrator
7007	Alarm of a PCM blocked junctor on LT2_RTC card ends **Action** No action, information for the administrator.
- Folio 8 de 8 -	

Operating system errors

Value(hex)	Error description
0	Normal.
1	Timeout for unaccomplished task request.
2	Insufficient memory space for task request.
2	Other task is currently accessing data protected by a region.
4	Task attempt to violate monitor protection.
5	Incorrect system call.
6	Token with a value corresponding to an impossible transition of this task status.
7	Task attempt to execute an operation resulting in an impossible state transition for that task.
8	System call not defined in monitor.
9	IT task has reached the authorised limit of SIGNAL$INTERRUPT.
0A	Interrupt task has accumulated a number of SIGNAL$INTERRUPT greater than the authorised limit.
0C	No available GDT entry (IRMX286 only).

Value(hex)	Error description
20	File already exists.
21	File does not exist.
22	Device driver and file driver are not compatible.
23	Illegal parameter combination.
24	Free position in directory.
25	Position outside directory limits.
26	File access denied.
27	Incompatible file type.
28	Incorrect file sharing request.
29	No free space.
2A	Incorrect peripheral controller request.
2B	I/O error.
2C	The connection in a call has been deleted before the end of the operation.
2D	“Incorrect named volume".
2E	Disabled peripheral access.
2F	Incorrect file driver request.

Value (hex)	Error description
40	Directory name begins with “:” but does not contain a “::” pair.
41	Extended I/O system can no longer transfer the remaining data from the buffer to the output peripheral.
42	Basic I/O system has insufficient memory space to process the request.
44	Peripheral containing required file not in service.
45	Extended I/O system cannot find the logical name requested in the object directories it manages.
46	The user currently attempting to detach the peripheral is not the peripheral processor.
47	Extended I/O system cannot create an I/O job because the requested object directory is too small.
50	Unknown I/O error.
51	I/O soft error. A fresh attempt may be successful.
52	I/O hard error. A fresh attempt is probably pointless.
53	Peripheral out of service. Operator action is required.
54	Volume write-protected.
60	An absolute format program is installed in a protected system memory area.
61	Illegal group component in the Group definition record.
62	Object file with an incorrect header record.
63	Segment definition record incorrect.
64	Checksum error while reading a record.
65	Unexpected EOF when reading file records.
66	File containing an incorrect fix up record.
67	Insufficient memory to meet dynamic loader needs.
68	Insufficient memory to create PIC/LTL segments.
69	Illegal record format.
6A	Record length exceeds the defined load buffer size.
6B	Incorrect record type.
6C	No start-up address.
6D	The maximum job size is less than the memory requirements specified in the file.
6E	Overlay name does not match overlay module names
6F	The defined file loader cannot handle the required load file characteristics.
70	The addres called by a data record loaded by the Application Loader is outside the limits of the segment created for that record.
80	Analysis buffer contains a literal with no closing quote marks.

- Folio 1 de 2 -

Value (hex)	Error description
81	The string returned as a parameter name is longer than that of the buffer supplied by the user at the time of the call.
82	Analysis buffer contains a command separator.
83	Analysis buffer contains a continuation character.
84	Numeric value contains an incorrect numeric character.
85	Last value missing in the list of values.
86	Joker character used in the wrong context, as an intermediate component of a complete file name.
87	Prepositions not allowed in command lines.
88	Wrong path name in command line.
89	User has pressed CONTROL-C during command loading.
8A	Command line contains an invalid control character.
8B	No more input path names whereas the list of output path names is not empty.
- Folio 2 de 2 -	

Programming error codes

Value (hex)	Error description
8000	Division by zero performed by a task.
8001	Overflow interrupt occurrence.
8002	A token refers to an existing object which is not the type of object required.
8003	Task attempting to access beyond the end of a segment.
8004	Task attempting to access beyond the end of a segment.
8006	The I/O system code was deleted due to an error in an application program. Recovery impossible.
8007	8087 error.
8008	Attempt to run an incorrect instruction.
800D	Memory protection violation.
800E	Attempt to load a segment record with an non-existent segment.
800F	Logical address incorrect (segment unknown or offset).
8021	No default distributor.
8022	No default prefix.
8040	The object specified is neither a connection device nor a connection file.
8041	Token refers to an existing object which is not a device connection.
8042	Token referring to an existing object which is not a file connection.
8060	The maximum size of the job specified is smaller than the job's minimum size.
8080	Error in the the internal analysis tables.
8080	Error in the the internal analysis tables.
8081	An human interface internal table has been deleted and contains an incorrect value.
8083	The string with the default output name is incorrect.
8084	The length of the path name returned is greater than 255 characters.